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*Ground Combat
in the JICM*

Barry A. Wilson, Daniel B. Fox

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*Ground Combat
in the JICM*

Barry A. Wilson, Daniel B. Fox

*Prepared for the
Director of Net Assessment,
Office of the Secretary of Defense*

National Defense Research Institute

Preface

The Joint Integrated Contingency Model (JICM) is a very large simulation system that encompasses the strategic and operational levels of land, air, and naval warfare with a global set of models and databases. This user manual for the ground combat portion of JICM is intended as a tutorial and reference manual for users of the JICM. JICM was developed at RAND under the sponsorship of the Director of Net Assessment in the Office of the Secretary of Defense as part of RAND's National Defense Research Institute, a federally funded research and development center sponsored by the Office of the Secretary of Defense, the Joint Staff, and the defense agencies. This manual was developed as part of the project "Improving Methods of Strategic Analysis: Next Steps in a Five-Year Development Plan." Comments and inquiries are welcome and should be addressed to the authors or to Dr. Gregory Trevorton, Director of RAND's International Security and Defense Policy Center.

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Summary

The Joint Integrated Contingency Model (JICM) is a very large simulation system that encompasses the strategic and operational levels of land, air, and naval warfare with a global set of models and databases. This document is an annotated briefing adapted from a class on the use of the ground combat portion of the JICM. It is an overview of the terrain, forces, and combat processes; the orders that manage combat; the parameters that set combat rates; and the displays that show what is occurring. It assumes that the reader is familiar with the operation of the JICM system software and the orders necessary to move ground forces to the theater of combat.

Part of the JICM, the Integrated Theater Model (ITM), integrates the best features of the two previous JICM theater combat models, the main theater model (CAMPAIGN-MT) and the alternate theater model (CAMPAIGN-ALT). It retains the CAMPAIGN-ALT representation of theater geography as a flexible network of important places and the links between those places, and uses the interactive orders and displays interface of CAMPAIGN-MT.

The first section of this document covers the network representation of the theater. The second section discusses ground units and the commands that organize them for combat on the network. The third section discusses ground combat, describing how forces come into contact, the attrition process, and the movement resulting from combat. The fourth section addresses the employment of attack helicopters and long-range artillery (such as ATACMS). The fifth and last section describes how units are managed within a command, how logistics are delivered, and how defenses are built.

The appendices provide details on all the parameters affecting the ground portions of the model.

Acknowledgments

The Joint Integrated Contingency Model (JICM) is a living program in the sense that a RAND development team is actively pursuing ongoing improvements in functionality and methodology of the system. Besides the authors, RAND staff actively involved in the JICM include Bruce W. Bennett, Arthur M. Bullock, Mark Hoyer, Carl Jones, John Schrader, and Robert Weissler. Bruce Bennett, the major designer for the current version of the ground combat model, contributed significantly with suggestions and editorial review.

While assistance from others is gratefully acknowledged, the authors assume responsibility for any shortcomings of this documentation.

Acronyms and Abbreviations

ADef	Air defense
AI	Air interdiction
APC	Armored personnel carrier
APED	Anti-Platform Equivalent Divisions
ARMD	Armored division
Arty	Artillery
ARV	Armored Reconnaissance Vehicle
ATACMS	Army Tactical Missile System
ATGM	Anti-Tank Guided Missile
BAI	Battlefield air interdiction
BMP	(Russian) Infantry Combat Vehicle
BRDM	(Russian) Amphibious Scout Vehicle
C3	Command, control, and communications
C3I	Command, control, communications, and intelligence
CAS	Close air support
CBTZ	Combat zone (rear position)
CFCK	Combined Forces Command, Korea
Cmd	Command
CONL	Control line
CONUS	Continental United States
CSS	Combat Service Support
DBX	Debugger (programming tool)
DCA	Defensive counter-air
D-day	Day on which hostilities commence (literally, Day-day)
DMZ	Demilitarized zone
DoS	Days of supply
DPRK	Democratic People's Republic of Korea
d-rate	Dispersal rate
ED	Equivalent Division
EED	Effective Equivalent Division
FLOT	Forward line of own troops (same as MOFL)
FSS	Fast Sealift Ship
Gnd	Ground
Gov, Govt	Government
G-type	Ground (force) type
Helo	Helicopter, attack helicopter
H-hour	Hour at which hostilities commence (literally, Hour-hour)
ICBM	Intercontinental ballistic missile
IFV	Infantry fighting vehicle
Inf, Infty	Infantry
IR	Infrared
ITM	Integrated Theater Model
ITV	Improved TOW Vehicle
JICM	Joint Integrated Contingency Model
JSTARS	Joint Surveillance and Target Attack Radar System
K-Kill	Catastrophic kill

KPD	Kilometers per day
KST	Kilo-short tons (1000s of tons)
KV	Killer-Victim
LAW	Light anti-tank weapon
LCAC	Landing Craft Air Cushioned
LoC	Line(s) of communication
LR-Arty	Long-range artillery
Mech	Mechanized
MEF	Marine Expeditionary Force
MLRS	Multiple-Launch Rocket System
Mnvr	Maneuver
MOFL	Most forward line
MPS	Maritime Prepositioned Shipping
MRLS	Multiple Rocket Launcher System
NUCARTY	Nuclear Artillery
OAS	Offensive air support
OCA	Offensive counter-air
OMG	Operational Maneuver Group
PAX	Passengers
PED	Platform Equivalent Divisions
POD	Port of debarkation
POE	Port of embarkation
POL	Petroleum, oil, lubrication
POMCUS	Prepositioned unit sets
rroro	Roll-on/roll-off [sealift]
SED	Situational equivalent division
SLBM	Submarine-launched ballistic missile
SOF	Special Operations Forces
SP	Self-propelled
SPOD	Seaport of debarkation
SPOE	Seaport of embarkation
TED	Tactical equivalent division
TOE	Table of Equipment (authorized equipment list for a force)
TOW	Tube-launched optically tracked, wire-guided (missile)
VSRBM	Very Short Range Ballistic Missile
WRM	War Reserve Materiel
WSDS	World Situation Data Set

1. ITM Ground Combat—Ground Network

ITM Ground Combat

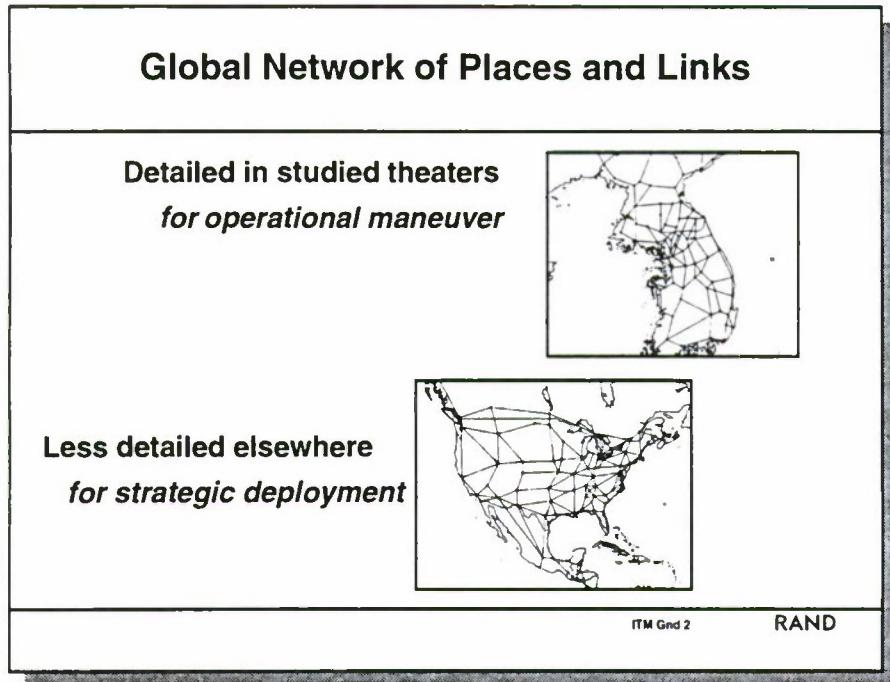
- 1. Ground Network**
- 2. Ground Forces**
 - Units
 - Ground Commands
- 3. Ground Combat**
 - Contacts
 - Attrition
 - Movement
- 4. Helos and Long-Range Arty**
- 5. Force Management**
 - LoC Commander
 - Logistics
 - Defenses

ITM Gnd 1 RAND

This document is an annotated briefing from a class on the use of the ground combat portion of the Integrated Theater Model (ITM) in the 1.0 version of the Joint Integrated Contingency Model (JICM). It is an overview of the terrain, forces, and combat processes, the orders that manage combat, the parameters that set combat rates, and the displays that show what is occurring. It assumes that the reader is familiar with the operation of the JICM system software and the orders necessary to move ground forces to the theater of combat.

Other documents provide an overall introduction to the JICM. Additional documentation covers aspects of the JICM models other than the ground combat model.

This document comprises five sections. The first section covers the network representation of the theater. The second section discusses ground units and the commands that organize them for combat on the network. The third section discusses ground combat, describing how forces come into contact, the attrition process, and the movement resulting from combat. The fourth section addresses the employment of attack helicopters and long-range artillery (such as ATACMS). The fifth section describes how units are managed within a command, how logistics are delivered, and how defenses are built.



Previous versions of the JICM required theater overlays to be constructed over regions of the world where combat was to occur and the precise locations of forces needed to be known. The ITM replaces these isolated theaters with a single global network for both surface movement and combat, defined in a new JICM data file *place.unc*. More detail on JICM geography can be found in Section 3 of the *JICM 1.0 Summary* (Bruce W. Bennett et al., Santa Monica, Calif.: RAND, MR-383-NA, 1994). This file provides data for two new JICM geographic concepts: *places* and *links*. *Places* are nodes in the surface network, and *links* define lines of communication (LoCs), which represent direct surface (road/rail) connections between places.

The JICM 1.0 land network database is extensive, with nearly 1000 places and 2000 links, but its resolution around the world varies to serve varying analytical needs. For example, where the network must support an ITM combat model adjudication, it can be made as rich as potential maneuver plans dictate. The JICM 1.0 network defines over 90 places and 140 links just in North and South Korea to support expected ITM scenarios there. Where only surface mobility needs to be simulated, a less rich network suffices. For example, the data for the continental United States have only about 65 places and 120 links to approximate the interstate road and rail networks across which strategically deploying forces would move. Finally, where analytic interest is trivial (accounting of forces only), the network can be very sparse. Thus, the African data contain only one or two places per country and the major connections between them.

Places Represent Ports, Cities, Bases, Road Junctures

Characteristics

- Unique name
- Latitude and longitude
- Region
- Owner
- Berths, if a port

Defined in data file *place.unc* (top half)

ITM Grid 3

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Each place has a unique name, which must not include blank characters or duplicate any other name in the database. It is usually the name of a city or town (e.g., New York, Seoul, and Moscow) but need not be (e.g., JctSKor1 is the name of a place needed to describe a major network node in South Korea that is not located near any significant town).

Places are located by latitude and longitude and by JICM region. Places are also used to represent islands by placing them in a sea region and designating the supporting land region for control and supply purposes. For example, DiegoGarcia is represented as an "island" place of the land region UK but is located in the sea region WIndian (West Indian Ocean).

The owner of a place is sometimes different from the owner of the region in which it is located. For example, the United States controls Guantánamo in Cuba in the JICM place data.

If a place is a seaport, its sealift capacity is described as a combination of five different berth types: deep roro, roro, container, tanker, and other. The comments in *place.unc* give a more complete description of the berth types.

The place data are specified in the data file *place.unc*. Places can be freely added by adding entries in this file (up to a current maximum of 3000) and remaking the database.

Links Connect Places

Characteristics

- **Places connected**
- **Length**
- **Position of border, if crossed**

Defined in data file *place.unc* (bottom half)

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The links define the arcs of a network. Individual links may intersect other links (arcs) only at places. The JICM input processor ensures that this assumption is not violated.

A link is defined by naming a pair of places to be connected. By default, the road distance between places is assumed to be the great-circle distance multiplied by a parameter (1.1 by default) to account for the divergence of real roads from the straight-line distance. Explicit distances can also be entered directly. If a link crosses a region border, the border is assumed to be midway between the two places, unless otherwise specified (e.g., the German-Polish border is explicitly defined to be 6% of the way along the link from FrankfurtOder to Poznan).

The link data are also specified in the data file *place.unc* and can be added to by the analyst up to a current maximum of 10,000.

Terrain Is Defined Along Links

Defined by orders at the start of a run

```
from to terrain-defns
set landwar - terrain Kimpo Inchon urban 12 40% \
open 20 60% end
```

<pre>from, to terrain-defns terrain width %-of-link</pre>	<p>end places of link one or more sets of terrain width %-of-link open, mixed, rough, mountain, urban, river average military width in kms % of link length covered</p>
---	---



Urban
Mountain
Rough
Mixed
Open
River

ITM Grid 5 RAND

The network of places and links is sufficient for positioning and routing forces and can be used to specify where combat will be simulated. But it does not include enough geographic data for simulating combat. The places and links are one-dimensional (points and arcs only), whereas combat forces have varying capabilities according to the type and expanse of battlefield terrain. In short, battles require area data.

Rather than include terrain data for the entire world in the database, terrain is entered through scripts given at the start of the scenario. JICM 1.0 provides terrain scripts for Korea in the use file "korea.geog" and terrain scripts for Poland in the use file "poland.geog" in the directory "Run/Env", which also contains other use files with scripts and orders that build combat environments.

The LANDWAR->terrain script (see Appendix J) allows any link to be overlaid by one or more terrain segments, which describe the type and width of terrain along the link. Segments of a link are defined sequentially along the link, starting from the first place named. The length of a segment can be given as the percentage of the total link length or a number of kilometers. There are six JICM terrain types: urban, mountain, rough, open, mixed, and river, which can be displayed on the JICM Map where defined, as shown above.

Naming Positions and Paths

- Positions on network given as
 - from-place/kms/to-place *Uijongbu/5.2/Kuhwa*
Uijongbu/5.2Kms/Kuhwa
KimFwd/border/Kaesong
- Specific positions can be named

<i>name</i>	<i>position</i>
set loc location Sdmz.3W	Kuhwa/5.2/Uijongbu
position	place/#kms/place
- Paths along the network can be named

<i>name</i>	<i>place-sequence</i>
set loc path axis.1	Kimpo>Inchon>Suwon>Osan
place-sequence	place>place>place>...

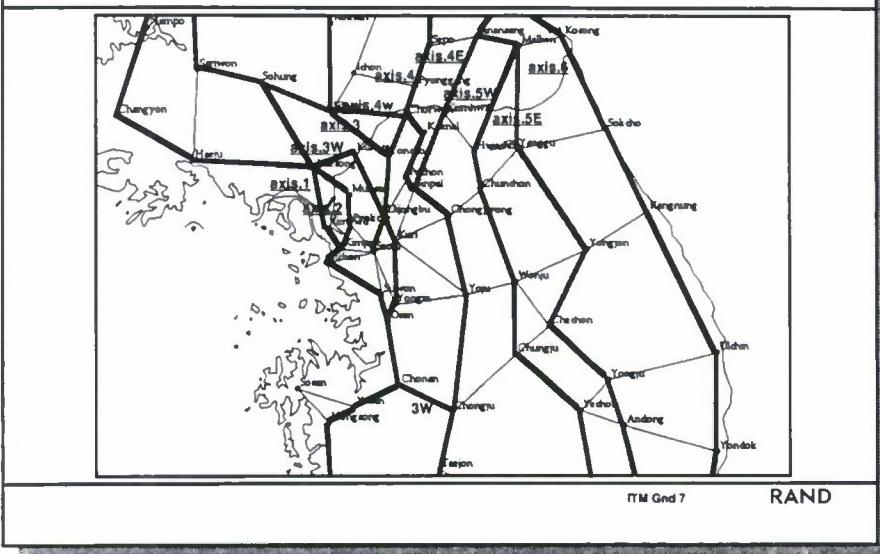
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The syntax for specifying a position on the surface network is either exactly at a place (e.g., "Seoul") or between places (e.g., "Washington/52.8Kms/Richmond", meaning 52.8 kilometers away from Washington along the link to Richmond). The abbreviation "Kms" is optional. If the link crosses a border, the word "border" can be used instead of a kilometer distance to specify a position at the border (e.g., Boston/border/Quebec). Distances are recorded only to the nearest tenth of a kilometer.

For convenience, specific positions can be named using the LOC->location script, and those names can be substituted in any order that requires a network position. For example, the positions of fixed defenses could be named and used in deployment orders. The locations of the two sides of the Korean DMZ are named in the Env use file "korea.geog."

Additionally, paths through the network can be named using the LOC->path script and used in orders instead of explicit paths. They are commonly used to set up the lines of communication or axes through a theater that define the plan for strategic maneuver. The axes used in the Korean scenario provided with JICM 1.0, shown on the next slide, are defined in the Env use file "korea.geog". The name of both the position and path must be unique across the database.

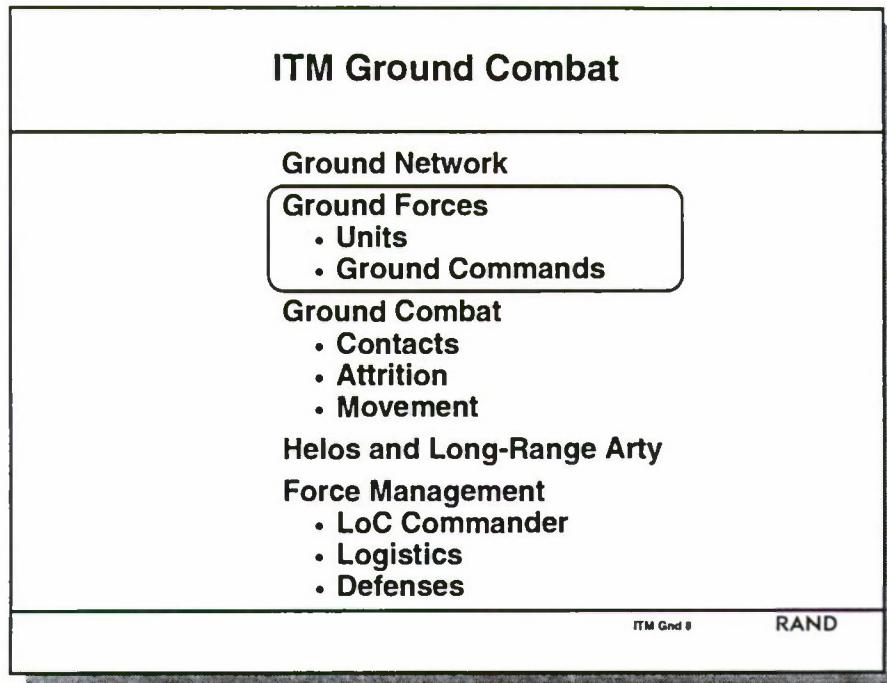
Korean Scenario Defined Paths



This slide shows the named paths (boldface lines) defined for the Korean scenario provided with JICM 1.0. The paths are defined by scripts found in the Env directory use file “korea.geog”.

The paths, named “axis.1” through “axis.6”, freely cross and overlay each other. Each path has a direction associated with it (from the first place to the last place named in the path definition). Placing a minus sign in front of the path name (e.g., `-axis.1`) reverses the direction on the path.

2. ITM Ground Combat—Ground Forces



We now turn to ground forces.

Classification of Ground Forces	
• Unit	<i>defined in ground.sec</i>
23-ARMD	
3-ARMD/256-MXB	
• Type	<i>defined in ground.sec</i>
US_armd, ARMD, TKD...	
• Class	<i>built-in</i>
	Armor, Mech, Infantry, Aircavalry (attack helicopter), Airmobile, Airborne, Arty, Amphib, Security, SOF, CSS
ITM Grd 9	RAND

As in previous JICM releases, ground forces are represented at the level of divisions and independent brigades. The model can accommodate other types of units, and they are included where they play a potentially critical role. Thus, tank or artillery divisions, independent helicopter regiments, and air-assault brigades are often represented. Other corps or army subordinated assets, such as air-defense and artillery units of brigade size or smaller, will often have their assets aggregated into corps- or army-level combat units. In a few cases, divisions must be divided into smaller units, either because they include an active/reserve mix (e.g., U.S. divisions with round-out brigades) or because they would likely be employed in less than divisional increments (e.g., Russian airborne divisions might be split into regiments).

Ground units are identified by name, which consists of a number or name, a “-”, and a unit-type designation, for example “23-ARMD”. JICM 1.0 includes a notation standard for establishing the unit-type designation, and this standard is reflected in the *ground.sec* data file. It involves designating the type and size of a unit. Types are designated in 1 to 3 capitalized letters (for example, armored forces are designated “ARM”, mechanized forces are designated “MX”, and infantry forces are designated “I”). The size of the unit is designated by a single capitalized letter, where “D” means division, “B” means brigade, and “N” means battalion. Thus an “IB” is an infantry brigade, whereas an “ID” is an infantry division. This standard is documented in the ITM design documents distributed to the JICM Working Group; it was instituted to overcome some confusion in the character of individual units in previous JICM versions.

Many units are grouped as sister units under a parent organization, such as a corps, army, or division. If so, the parent’s name and the unit’s name follow the same naming convention. The parent’s name precedes the unit’s name, separated by a “/”, as in 3-ARMD/256-MXB. The ground order-of-battle data are in the ground forces table in the *ground.sec* data file.

Each type of ground force is defined (in the type table) in data file *ground.sec*, and new types can be added by the analyst. Force readiness and deployment data are associated with the unit type and are also described in this file.

Each ground force type is also defined to be a member of a broad class according to how it is used in the model. These classes cannot be changed by the analyst. Some orders can be given collectively to these classes of forces within a region or owned by a particular owner (e.g., all South Korean mechanized units could be alerted).

Unit Characteristics	
<ul style="list-style-type: none">• Name and owner• Type• Equipment in 14 categories<ul style="list-style-type: none">- inventory and score• Equivalent division (ED) score• Assigned command and mission• Mobilization, alert, training, and cohesion levels (0-100%)• Combined effectiveness multiplier• Position on network• Days of supply	RAND

This display lists most data kept for a ground unit. As pointed out earlier, each individual unit is described in the ground forces table in the data file *ground.sec*.

Original inventory, current inventory, and the score of weapons are carried in each of 14 categories. The JICM is using a new, RAND-developed scoring system described in Bruce W. Bennett, "Evaluating the Capabilities of Ground Forces in the Evolving World," unpublished draft. For display purposes, the equipment score, excluding air defense and attack helicopters, is totalled and converted to an equivalent division (ED) score, where 1.0 ED is defined as the value of the 1990 U.S. 1st Armored Division, without a slice of corps combat assets.

Mobilization, alert state, training level, and combat cohesion are described in percentages. *Alert* represents the degree to which the unit is deployed for combat, and *cohesion* represents the unit's ability to fight as a coordinated unit. These factors and others, including parameters set by the analyst, are combined into a single effectiveness multiplier for the unit.

Position is a standard network location—either a place (e.g., Seoul) or a distance along a link from one place to another (e.g., Seoul/24kms/Kuhwa).

Unit Equipment Categories	
<ul style="list-style-type: none">• Armor<ul style="list-style-type: none">– Tanks– Anti-armor IFV/APC– Other anti-armor armor– Other APCs– Other armor• Infantry<ul style="list-style-type: none">– Long-range anti-armor– Short-range anti-armor– Mortars– Small arms	<ul style="list-style-type: none">• Artillery<ul style="list-style-type: none">– Self-propelled– Towed• Attack Helicopters• Air Defense<ul style="list-style-type: none">– Radar homing– Optical/IR homing
<p><u>Optional</u></p> <ul style="list-style-type: none">• Long-range Artillery<ul style="list-style-type: none">– MRLS, ATACMS	
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These weapon categories were developed with colleagues at RAND and the JICM Working Group to represent most of the significant differences in roles for which ground combat weapons are defined:

Tanks--All medium and heavy tanks (e.g., M1-A1 or T-80)

Anti-armor IFV/APC--All armored infantry carriers with an anti-armor capability (e.g., BMP or Bradley)

Other anti-armor armor--All other armored vehicles (including ARVs and anti-armor vehicles) with an anti-armor capability (e.g., ITV, BRDM with AT-3, or PT-76)

Other APCs--Armored infantry carriers without an anti-armor capability (e.g., M-113 or BTR-50)

Other armor vehicles--Other armored vehicles without an anti-armor capability (e.g., ARVs such as the Ferret)

Long-range anti-armor--Long-range anti-armor systems carried by infantry, mounted on light vehicles, or towed (e.g., man pack TOW, AT-3, or anti-tank guns)

Short-range anti-armor--Short-range anti-armor system (e.g., LAWs, Dragon, and recoilless rifles)

Mortars--Mortars under 100 mm

Small arms--Rifles, machine guns, and similar weapons carried by combat infantry forces

SP artillery--Self-propelled artillery, and mortars over 100 mm (e.g., MLRS or M-109)

Towed artillery--Towed artillery and mortars over 100 mm (e.g., M-114 or D-30)

Attack helicopters--Helicopters with a primary anti-armor or indirect-fire mission (e.g., AH-64 or Hind)

Radar homing air defense--Organic air-defense systems with radar homing (e.g., SA-8 or Roland)

Optical/IR homing air defense--Organic air-defense systems requiring optical sighting and/or IR homing (e.g., Stinger or Vulcan)

Long-range artillery--Up to two user-defined systems that are adjudicated in a similar way to CAS, BAI, and attack helicopters (e.g., ATACMS).

Unit Effectiveness Accounts for Personnel and Leadership Factors

EEDs (Effective EDs) = EDs x Effectiveness multiplier

Effectiveness multiplier =

Mobilization level (25% minimum)

- x Alert level (50% minimum)**
- x Training level**
- x Cohesion factor**
- x Supply factor (based on days of supply on hand)**
- x Parameter multipliers (next slide)**

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RAND

In ITM, the strength of ground forces is measured in terms of the equipment held by each unit, personnel and leadership factors, and combat situational factors. A unit's effective strength, or Effective Equivalent Divisions (EED) score, is derived by multiplying its equipment score in EDs by a number of personnel/leadership factors. Those factors reflect the current readiness of the unit and effectiveness multipliers set by the analyst through parameters described in the next slide.

The supply of a unit is measured in days of supply at the normal rate of consumption. It is covered in detail in the logistics portion of Section 5. The effectiveness multiplier derived from days of supply on hand is as follows:

<u>days</u>	<u>multiplier</u>
2.0+	1.0
1.0-1.99	0.67
0.5-0.99	0.5
0.25-0.49	0.1
0.15-0.24	0.05
0-0.14	0.001

Currently, these factors cannot be changed.

The cohesion factor is discussed on page 15.

Effectiveness Parameters

UNIT->effective - effectiveness multiplier for an individual unit

CMDGOV->gnd_mult - multiplier of all ground forces of the command or owner

CMDGOV->comb_mult - multiplier if in a command with another owner's units

CMDGOV->home_mult - multiplier when fighting in home region(s)

CMDGOV->cntr_battery, cntr_mnvr - multiplier of arty counter-battery fire or counter-maneuver fire

CMDGOV->armr_mult, lnfty_mult, arty_mult, helo_mult, adef_mult - multiplier of these individual equipment components

LANDWAR->chemical, surprise - multipliers that linearly return to 1.0 over a set time

ITM->overrun_mult - multiplier if unit is overrun

ITM->shock_mult, shock_hours - multiplier when first contacted on flank or rear; returns to 1.0 over shock-hours

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RAND

These are the parameters through which the analyst can vary the personnel and leadership factors in ground force effectiveness. These multipliers must be used with caution because their effects compound. Thus, the baseline for any given analysis might use values of 1.0 for many of the more subjective factors (such as national fighting effectiveness, fighting on home territory, and combined-operations effectiveness), and modest factors for the others. The analyst should then sensitivity-test the range of multipliers and examine their effect on unit value in some detail (looking at issues such as how the model employs a unit, and not simply looking at combat outcomes) when multiple factors are allowed to vary from a value of one. In the end, the analyst must strike a balance between the compounding effects of multipliers, rather than understating (or ignoring) the implications of personnel and situational factors, which in many historical cases have proven highly significant.

Unit Cohesion Measures

Ability to Fight as a Coordinated Unit

Cohesion level = attrition-factor x training-factor

attrition-factor: starts at 1.0

reduced by percentage combat losses

recovered at rate set by MATERIEL->days_recover

training-factor: $(1 + \text{training-level}) / 2$

FORCE->no_tng turns off

Cohesion multiplier of effectiveness =

1.0 if cohesion-level > ITM->coh_curve_factor (default 0.8)

or cohesion-level / ITM->coh_curve_factor

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RAND

In ITM, unit cohesion is a number from 0 to 1.0 that is a combination of factors for attrition and training. While the unit is in combat, the attrition factor is reduced by the same percentage as the unit's equipment losses. While out of combat, it is recovered at a rate set by the parameter MATERIEL->days_recover. This recovery is not related to the unit's repair or reissue of equipment losses, although a separate equipment recovery procedure exists. The training factor varies from 1.0 to 0.5 as the training level falls.

Loss of cohesion does not immediately reduce unit effectiveness. The parameter ITM->coh_curve_factor sets the level of cohesion at which the calculated effectiveness multiplier begins to fall below 1.0. This level is 0.8 (or 80% cohesion) by default.

The effect of training on cohesion is not considered if the parameter FORCE->no_tng is set.

Unit Display Lists individual ground forces												
<u>cmd-or-owner location</u>												
display unit ground	CFCK	SKorea										
SKorea Ground Forces as of 12:00 GMT, day 3												
-----Readiness-----												
Name of Unit	Eqp	Mob	ED	EED	Command	Location	Enroute					
CAP-DEF/1-SPT	100%	100%	0.04	0.02	KS_1	Seoul						
CAP-DEF/52-HRD	100%	34%	0.22	0.02	KS_1	Seoul	Uijongbu					
CAP-DEF/56-HRD	100%	34%	0.29	0.03	KS_1	Seoul	Seoul					
CAP-DEF/57-HRD	100%	34%	0.29	0.03	KS_1	Seoul						
CAP-DEF/60-MRD	100%	54%	0.24	0.05	KS_1	Seoul	Seoul					
CAP-DEF/71-MRD	100%	54%	0.24	0.05	KS_1	Uijongbu						
1-CORPS/1-SPT	100%	100%	0.02	0.01	KS_1W	Seoul	Munean					
1-CORPS/1-ID	99%	100%	0.28	0.28	KS_1W	Munaan						
1-CORPS/9-ID	100%	100%	0.27	0.27	KS_1W	Pyokche						
1-CORPS/25-ID	59%	100%	0.17	0.17	KS_1C	Uijongbu						
1-CORPS/28-ID	100%	100%	0.28	0.28	KS_1E	Yonchon						
1-CORPS/101-ID	99%	100%	0.10	0.10	KS_1W	Munean						
mobilization x training												
% of original equipment strength												
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The unit display lists the name of units for a specified owner or assigned command, and a specified region. A “-” in either field means no restriction.

Equipment strength is expressed as a percentage of original aggregate inventory.

“Location” is the nearest place on the network, and “Enroute” shows the nearest place to the destination of the unit if the unit is moving.

Find Display
Details an individual unit

display find 2-MXD/1-MXB US

Status of 2-MXD/1-MXB[US] as of Day 5, 0000Z										
Force Class	Force Type	Mobilization	Alert	Training	Strength	EDs	EDDs			
Mechanized	US_mxb	100%	0%	100%	100%	0.39	0.20			
WPNs	Tank	IFV	APC	Hvy	Lgt	LR	SR	Sm	Sm	SP
EDDs	100	100	100	50	0	0	70	0	83	Td
EDDs	0.081	0.044	0.013	0.016	0	0	0.004	0	0.016	0.022
Unit aleo hae: (relative effectiveness)										
17.0 Atk-Helo [17.000]										
33.0 OIR-Adef [16.5000]										
Current Effectiveness Multipliers:										
GND-alert 0.50 ←										
CMD-atk-helicopter 2.00										
Product multipliers are:										
For total EDDs: 0.50										
For armor EDDs: 0.50										
For infantry EDDs: 0.50										
For cntr-maneuver EDDs: 0.50 ←										
For cntr-hattry EDDs: 0.50										
For atk-helo scoree: 1.00										
For air defense scoree: 0.50										
For Other-Wpn scoree: 0.50										
Force is now at Uijonghu It currently has on enemy contacts. Assigned to CFCK (which has control)										
GND - unit's personal param or situation CMD - command's param (cmdgov table) GOV - owner's param (cmdgov table) ITM - theater param (itm table)										
Total multiplier in 8 categories										

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The find display includes details of an individual unit's readiness, equipment strength, and various effectiveness factors.

All multipliers of the unit's effectiveness (either parameter or calculated) that are not 1.0 are listed after the heading "Current Effectiveness Multipliers:". Parameter names are preceded by their capitalized table name, either GND, CMD, GOV, or ITM.

Following the list of individual factors is the total effectiveness multiplier for the unit, as well as multipliers for different subcategories of equipment used in the combat calculations.

Ground Force Missions	
Specify Combat Roles	
<u>Specify role within a command (guidance for LoC Commander)</u>	
Front	engaged in front contact
Reserve	committed to front as required; engaged in rear contact
Flank	engaged in flank contact
Security	engages overrun forces
Reconstitute	stationary until recover sufficient cohesion; then become reserve, engaged in rear contact
<u>Defend in fixed positions</u>	
Positional	defend a specific section of the network
<u>Fire support missions</u>	
Support/Strike	described in Section 4 for attack helos and long-range arty

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RAND

Ground units engaged in combat are either organized into ground commands (explained below) or placed in positional defenses to defend a specific length of the network. The potential for allocation of a force between front, flank, and other battles is discussed in the next slide.

The front, reserve, flank, security, and reconstitute missions reflect the nominal position of the unit within its ground command and the types of contacts in which it is engaged.

The positional mission places a unit in static defenses over a specific length of the network, with limited movement allowed.

The support and strike missions direct the attacks of attack helicopters and long-range artillery and are covered in Section 4.

GndMission Order

For missions within mobile commands

<u>cmd</u>	<u>mission</u>	<u>unit</u>	<u>ownr</u>	<u>set</u>	<u>trrn</u>	<u>attr</u>	<u>obj</u>	<u>day</u>
order	KNSC	gndmis	front	1-MXD	NKor	-	-	-
<u>set</u>						enter 'set' to script change instantly, or '-'		
<u>trrn</u>						terrain in which unit will operate, or '-'		
<u>attr</u>						% attrition at which to abort the mission, or '-'		
<u>obj</u>						position at which mission will end, or '-'		
<u>day</u>						days from D-day at which to end the mission, or '-'		

- **Missions: Front, Reserve, Reconstitute, Security, Flank**
- **Default mission is Reserve (other missions need only be specified when the user wishes a particular configuration)**

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RAND

The front, reserve, flank, and security missions specify the role and position of the unit within its ground command. The reconstitute mission speeds the recovery of cohesion and makes a unit a priority for equipment replacement. By default, units assigned to a ground command have the reserve mission and are rotated between front, reserve, and reconstitute missions as required by the combat situation. An ITM module called the LoC Commander makes these decisions based on analyst guidance. The GndMission order overrides the LoC Commander.

The GndMission order sets the mission for a ground force (and any child units) specified by name and owner. The "set" field implements the new mission instantly, as long as the unit is within its assigned command, while a "-" allows the unit to move to its new position normally. The "trrn [terrain]" type specification is intended to deal with terrain that is of mixed type on a given LoC segment (e.g., a valley with mountains on either side); because this terrain option is not implemented in JICM 1.0, this entry is ignored. The "attr [attrition]", "obj [objective]", and "day" fields specify conditions under which the mission will be aborted (reverting to the reserve mission). The reconstitute mission does not have attrition and objective abort conditions.

GndMission Order

For positional defense mission

```
cmd      mission  unit  ownr  orientation  trrn  spd
order  CFCCK gndmis position 2-MXD SKor -(30)axis.1(Sdmz.1)  -  5
      orientation consists of [-] [(length)]path(front)
      -          (optional) reverse direction
      length     (optional) km length
      path       explicit (seoul>kimpo>...) or named path (axis.5W)
      front      position of command's front (place or place/kms/place)
      trrn       terrain to operate in when available, or '-'
      spd        km/day speed unit can be pushed back by attack
```

- Orients a unit of limited mobility to defend a specific position on the network

ITM Gnd 20RAND

The concept of positional ground force units reflects the fact that in many parts of the world, ground combat units have very limited mobility and are essentially assigned to defend a given piece of terrain (and not to fall back when pressed by an attacker, as in the former Central European paradigm). While units in positional defenses do not advance, they may move backwards if pressed, up to a specified rate per day (which may be zero), reflecting the mobility of the unit and its intended employment. If an attacker advances past the rear of a defending positional unit, the positional unit is assumed to continue to survive in the rear area of the attacker, although it will have less cohesion and will incur an attrition penalty for being overrun. The attacker must then allocate some of its forces to isolating and "mopping up" the enemy force in its rear; the enemy force continues to fight until it reaches a level of strength that is insufficient for it to continue to exist.

The "trrn [terrain]" field specifies a required terrain type (but is not used in JICM 1.0). The "spd [speed]" field is the number of kilometers per day (KPD) that the unit can move its position to the rear.

Deploy Order

Moving all units to their default destinations

<i>cmd</i>	<i>class</i>	<i>origin</i>	<i>ownr</i>	<i>subcmd</i>	<i>#/%</i>	<i>dest</i>	<i>modes</i>
order	CFCK	deploy	troops	SKorea	-	-	100% - -

<i>class</i>	class of unit affected
<i>origin</i>	region in which units are affected
<i>subcmd</i>	restriction to child command; “-” for none
<i>#/%</i>	number of divisions to deploy or percentage of total possible units affected
<i>dest</i>	destination; “-” for default
<i>modes</i>	deployment options (not detailed here)

- **Order all units to deploy to their logical destinations**

- to their assigned command if oriented
 - to their position if given a positional mission

ITM Gnd 21

RAND

The Deploy order has many forms and options, and is used to deploy all types of forces both in-theater and around the globe. In many scenarios, the only in-theater deployment necessary will be that of all units to their forward positions prior to D-day. This is accomplished by the single order illustrated by this slide, which deploys all units of the class *troops* (all ground units) in South Korea to their default destinations. The default destination of a unit is its assigned command, if that command is oriented on the ground network, or a network position if the command has been given a positional defense mission with the GndMission order.

In general, units are assigned to commands and given positional defense missions individually, then this single order is given to deploy all units of the theater command in the region. As other units arrive in the theater and are given assignments and missions, this order can be safely repeated, because it does not affect units that are already at their default destinations.

Deploy Order

Moving individual units on the network

```
govt      name route>destination mode/mode/...
order US deploy 1-MXD Taejon>rail>Seoul dos=N/day5,0000z

      route                                network place through which to route
      place                                assisted, rail, administrative, tactical
      instruction                         network place
      destination                         network position
      place                                to an oriented command
      position                            default destination
      command
      -
      mode                                earliest departure time
      dayX, HHMMz                         days of supply to move with
      dos=N                                reassign unit before deployment
      cmd=xxx
```

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Another form of the Deploy order moves individual units on specific routes through the ground network. In this form, the destination can be preceded by a sequence of places and instructions, separated by ">", that form a route through the network. The instructions pertaining to in-theater movement specify the mode of transportation taken to reach the next place in the sequence. In the illustration on the slide, the unit will deploy to Taejon using its default mode of transportation, then deploy to Seoul using the rail speed.

The final destination, the last item in the sequence, can be a place, position between places, or the name of an oriented command. When deploying to a command, the unit will follow the command if the command moves while the unit is deploying.

Units with a positional defense mission must be deployed using a dash as their destination, which deploys them to their default destination, the position specified in their mission. Any other destination will cancel the mission (even the same position given in the mission).

The mode field also has many options, more than one of which can be given if separated by "/". The three options pertaining to in-theater movement are shown in the slide.

Types of Commands

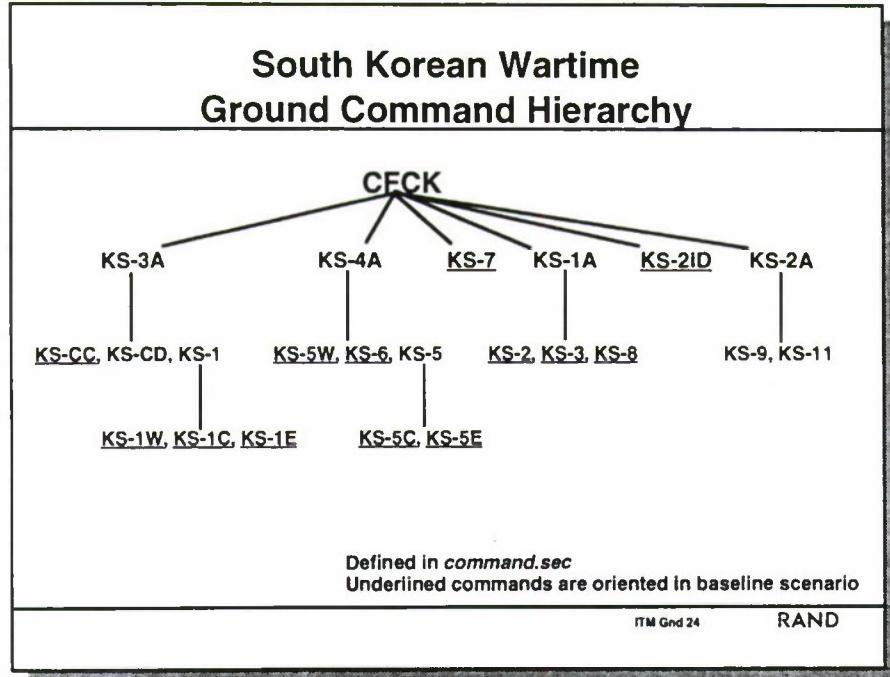
- **Theater** - defines a combat theater
 - required superior for air, ground commands
- **Ground** - organizes ground forces for combat
 - **Mobile**: normal attack and defense missions
 - **Positional**: organizes arty support of forces in positional defenses
- **Air** - organizes air forces for combat
- **Sea** - naval command
- **Lift** - strategic lift may be assigned

In general, forces are assigned to commands so that they can be organized for warfighting. Commands are arranged in a hierarchy, from theater commands, such as CFCK (Combined Forces Command, Korea), to a command covering a single corps sector or less. Each command can be one or more of the above types, each handling different forces within the JICM.

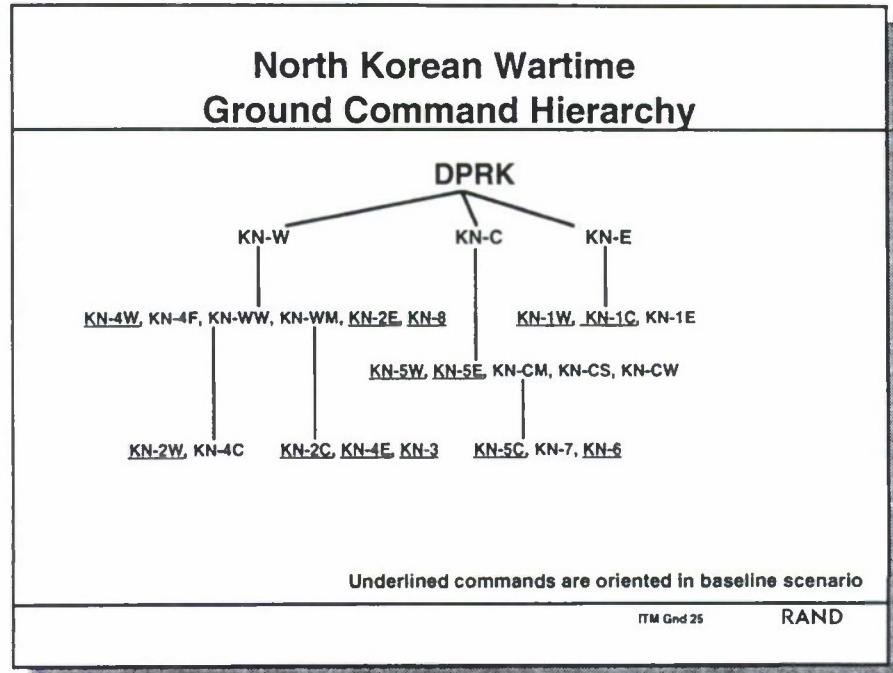
Ground and air commands are the warfighting commands in the ITM. A ground command has a length and position (orientation) on the surface network, and organizes the forces assigned to it for combat, according to its assigned mission. Mobile ground commands have attack and defend missions and move freely on the network as combat is adjudicated. A command with a positional mission covers units in positional defenses and organizes the employment of assigned independent artillery units.

Air commands are discussed in other documentation. A command may be both a ground command and an air command, for instance a command representing a Marine Expeditionary Force (MEF). Such a command could have both air and ground units assigned and would accept both air and ground orders.

Commands are defined in the data file *command.sec*, except that a ground command is made mobile or positional by the orders given it during a run.



This slide diagrams the default hierarchy of commands in South Korea, as defined in the data file *command.sec*. CFCK is the theater command in South Korea. Any of the commands without subordinates could be oriented on the network to fight, but only the underlined commands are oriented in the Korean scenario provided. Because of the limited mobility of the forward South Korean forces, most of these commands are positional.



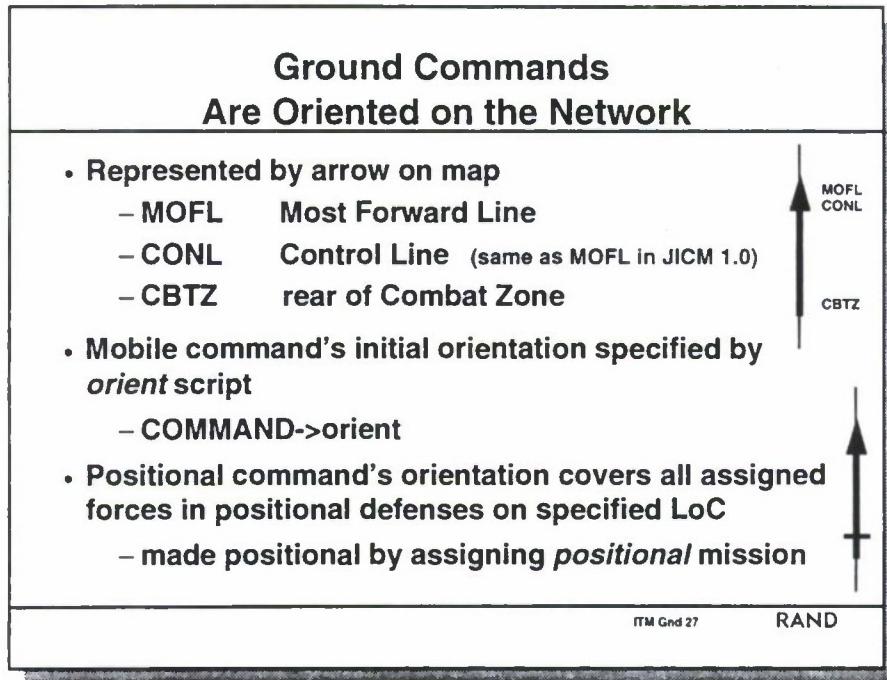
This slide diagrams the default hierarchy of commands in North Korea, as defined in the data file *command.sec*. DPRK is the theater command in North Korea. All commands shown here under DPRK are ground commands, but only the underlined commands are oriented in the Korean scenario provided. Some of these commands are actually echeloned behind others in the Korean scenario provided and do not have an independent orientation.

Cmd Ground Display Summarizes assigned forces																																																																					
<u>command</u> <u>owner</u> <u>location</u>																																																																					
display command ground CFCK SKorea SKorea																																																																					
Assigned CFCK, Owned by Anyone, Located Anywhere (12:00 GMT, day 3, case a98)																																																																					
<table><thead><tr><th># of Divs Type</th><th>Days When Ready</th><th>Surviving Divs</th><th>EDs</th><th>EDDS</th><th>Total EDs</th><th>Total EDDs</th></tr></thead><tbody><tr><td>1.3 Armored</td><td>0</td><td>1.33</td><td>0.55</td><td>0.55</td><td>0.55</td><td>0.55</td></tr><tr><td>4.3 Mechanized</td><td>0</td><td>4.33</td><td>2.13</td><td>1.90</td><td>2.13</td><td>1.90</td></tr><tr><td>44.7 Infantry</td><td>0</td><td>17.67</td><td>4.70</td><td>4.69</td><td>11.30</td><td>5.71</td></tr><tr><td></td><td>1-20</td><td>7.00</td><td>1.79</td><td>0.54</td><td></td><td></td></tr><tr><td></td><td>20-40</td><td>20.00</td><td>4.80</td><td>0.48</td><td></td><td></td></tr><tr><td>2.0 Artillery</td><td>0</td><td>2.00</td><td>0.56</td><td>0.56</td><td>0.56</td><td>0.56</td></tr><tr><td>2.0 Marine</td><td>0</td><td>2.00</td><td>0.51</td><td>0.51</td><td>0.51</td><td>0.51</td></tr><tr><td>54.3 Total</td><td></td><td></td><td></td><td></td><td>15.05</td><td>9.23</td></tr></tbody></table>							# of Divs Type	Days When Ready	Surviving Divs	EDs	EDDS	Total EDs	Total EDDs	1.3 Armored	0	1.33	0.55	0.55	0.55	0.55	4.3 Mechanized	0	4.33	2.13	1.90	2.13	1.90	44.7 Infantry	0	17.67	4.70	4.69	11.30	5.71		1-20	7.00	1.79	0.54				20-40	20.00	4.80	0.48			2.0 Artillery	0	2.00	0.56	0.56	0.56	0.56	2.0 Marine	0	2.00	0.51	0.51	0.51	0.51	54.3 Total					15.05	9.23
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54.3 Total					15.05	9.23																																																															
ITM Gnd 26 RAND																																																																					

The cmd (command) ground display may be used to obtain a summary of the ground forces assigned to any command, or owned by any government, or located in any region. A command, owner, or region can be specified to restrict the forces displayed, or a “-” can be entered for unrestricted.

The “Days When Ready” column estimates the mobilization and training time required within 20-day increments (e.g., 1-20, 20-40).

The “Surviving Divs” column gives the number of divisions of that type, from the definition of the class in *ground.sec*. A brigade is counted as 0.33 division; for some force classes, this number may be artificial.



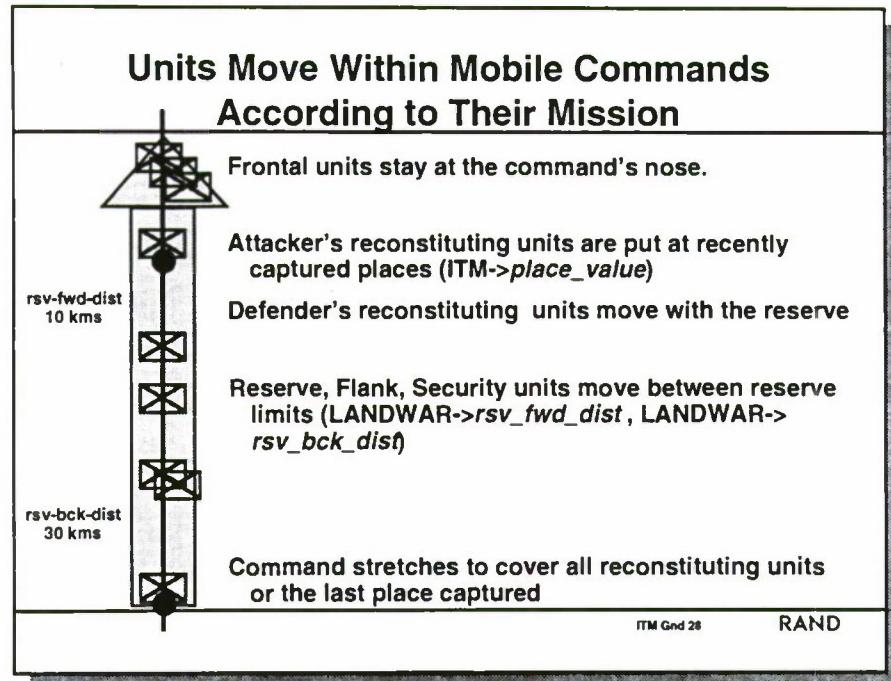
Ground commands that are going to enter combat are positioned (or oriented) on the network, and are represented on the JICM Map by an arrow.

Ground commands are characterized by three positions:

- MOFL—the most forward position of any forces, represented by the tip of the arrow.
- CONL—the position behind which it has more complete control (enemy forces behind this line are overrun or inserted). In JICM 1.0, the CONL is always at the same position as the MOFL. In future work we hope to allow them to separate to represent the dynamics of non-linear battlefields.
- CBTZ—the rearmost end of the command (or combat zone).

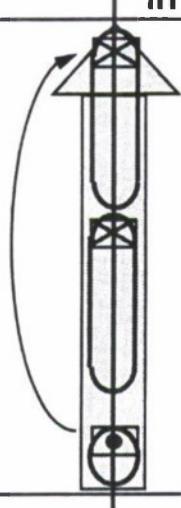
Mobile commands (those that will not be given a positional mission) must be given an initial orientation on the network through the COMMAND->orient script described in Appendix K.

The orientation of a positional command is determined each adjudication period by ITM so as to cover all assigned forces in positional defenses. On the JICM Map graphic display, the arrow of a positional command has a cross bar at the rear.



Ground units that are within their assigned command's orientation on the network automatically take up position within the command according to their own mission. Frontal units stay at the command's nose; reserve, flank, and security units stay between the parameter limits, moving only when required to minimize exposure to air attack. Reconstituting units of the attacker are dropped off at places in order to secure the flank approaches to the command, while those of the defender move backward with the reserve. The parameter ITM->place-value lets the analyst rank places for the attacker's reconstituting units; otherwise, the most recently overrun place is chosen.

**Positional Commands Organize Arty Units
in Defense of Positional Units**



Orientation of unit in positional defenses shown by "sausage"

Command covers most forward and rear assigned units

Assigned arty unit supports the battle at the command's front, even though in positional defenses

Parameters

LANDWAR->arty_trap_pct - % of the command's separate arty that is lost with the forward maneuver unit

LANDWAR->arty_escape_pct - % of forward maneuver unit's arty that escapes overrun (and is added to the supporting command's separate arty)

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The position of a unit in positional defenses is shown on the JICM Map as a sausage shape. A positional command is automatically drawn to cover all assigned units in positional defenses (which is the only mission allowed these units) along the path of the positional command, even if a unit is overrun by an enemy command.

Units in positional defenses move only when pushed back by an enemy command. However, independent artillery units (Arty class) assigned to the command are assumed to be supporting the frontal battle. This support is provided only if the positional forces are organized in a positional command; otherwise, the artillery unit would fire only when the enemy command moved within range of its actual position.

When the frontmost positional defender is overrun, a parameter-designated percentage of its artillery is transferred to the supporting command's artillery unit (if one exists), and a percentage of the artillery from supporting artillery units is lost (destroyed) with that unit.

Orient Mobile Commands

Orient a command on the network

<i>cmd-cmd</i>	<i>orientation</i>
set command orient	KS-5W -(30)axis.4W(Sdmz.4W)
orientation	consists of [-][(length)]path(front)
-	(optional) reverse direction
length	(optional) km length
path	explicit (seoul>kimpo>...) or named path (axis.5W)
front	position of command's front (place or place/kms/place)

Echelon a command behind a sister command

<i>command</i>	<i>rear-cmd</i>	<i>fwd-cmd</i>	<i>commit-pos</i>
order	DPRK	echelon	KN-7 KN-5C Kalmal
<i>commit-pos</i> position where rear-cmd forces available as reserve			

ITM Grid 30

RAND

A command is initially positioned on the network with either the orient script or the Echelon order. The "orient" script specifies the position of the command's front, its length, the path through the network along which it lies, and the direction along the path it faces (a path's direction goes from left to right along its list of places). Only ground commands with no subordinate commands may be oriented.

An "echeloned" command follows behind another command and is available as reserves for that command when a specified position on the network is reached. The echeloned command is not shown on the JICM Map, but its name is stacked behind the name of the forward command. Only sister commands, that is, commands that have the same direct superior in the command hierarchy, can be echeloned. The echeloned command must not be oriented: It will share the orientation of the command behind which it is echeloned.

Ground Command Missions

Main-attack	high intensity
Support-attack	
Pin-attack	low intensity
Defend	
Defend-delay	delay outside fixed defenses
Defend-withdraw	withdraw outside fixed defenses
Delay	
Withdraw	
Follow	follow a command at set distance
Join-attack	attack toward a friendly command to envelop
Positional	assigned units are all in positional defenses

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RAND

The *mission* of a command directs how it operates over the theater network. The three attack missions characterize the intensity of the attack, which affects the combat loss and movement rates, and supply consumption rates. The parameters setting these effects are given on following slides. There is no restriction on how these or the other missions can be assigned to commands.

The five defense missions specify how rapidly ground is yielded and how to use fixed defenses. The defend-delay mission switches to delay when the command is not in fixed defenses, and the defend-withdraw mission switches to withdraw under the same conditions. The delay and withdraw lead to higher movement rates but lower the fraction of the defender that is engaged and lower vulnerability to breakthroughs.

Other missions that have been defined but await future implementation are Air-drop, Air-assault, Pass-thru, Penetrate, and Break-out.

CmdMission Order

For normal missions

<u>command</u>	<u>mission</u>	<u>route</u>	<u>divs</u>	<u>attr</u>	<u>day</u>
order	KN-2C	cmdmis	defend	(Ndmz.3W)axis.3W(Kuri)	5 50% 8

route [-] [({init-pos})]path[({object})]
init-pos initial position (place or place/kms/place), or '-'
path explicit (seoui>kimpo>...) or named path (axis.5W)
object position at which mission will end
divs number of divisions to keep at front, or '-'
attr % attrition at which to abort the mission, or '-'
day days from D-day at which to end the mission, or '-'

• **Missions: Main-attack through Withdraw**

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The "CmdMission" order assigns a mission to a command. The normal attack and defense missions require the specification of a route to follow, the number of divisions to employ at the front, and abort conditions similar to those for the unit missions.

The route will generally be a named path predefined in the scenario with the LOC->path script, explained earlier. Both an initial position and a final objective, at which the command will halt, can also be specified.

CmdMission Order For special missions

Follow, Join-attack:

<i>command</i>	<i>mission</i>	<i>command</i>	<i>divs</i>	<i>attr</i>	<i>day</i>	
order KN-8	cmdmis	follow	KN-5C	5	50%	8
<i>command</i>	command to join					
<i>command@km</i>	command to follow; optionally specifies kms distance					

Positional:

<i>command</i>	<i>mission</i>	<i>path</i>
order KS-5C	cmdmis	positional -axis.5
<i>path</i>	path along which all positional forces are dug-in	

ITM Grid 33

RAND

The special missions Follow, Join-attack, and Positional require somewhat different formats of the CmdMission order.

Instead of specifying a route, the Follow and Join-attack missions specify a target command to follow or attack toward.

The Positional mission specifies a path along which its assigned units are in positional defenses. The command is then automatically oriented to cover these units.

Contingency Plans Can Be Executed When an Objective Is Reached

```
gnd-cmd filename position  
set command call-plan KN2C korea.sinpal MOFL Sinpal
```

filename	name of use file, relative to the Run directory
position	place or place/km/place

- The use file is executed when the command reaches the specified position, even within the model 4-hour time step

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RAND

The call-plan facility is a useful way to create conditional branches within the use files that control a scenario. This order specifies a use file to be run when a specified ground command advances or withdraws to a specified position. This capability is commonly used to force a change of mission or commit reserve forces. Note that the orders in the use file will be executed at the exact time the ground position is attained, even if this time is within a 4-hour adjudication period.

itm-land Display

Shows the situation of an oriented ground command

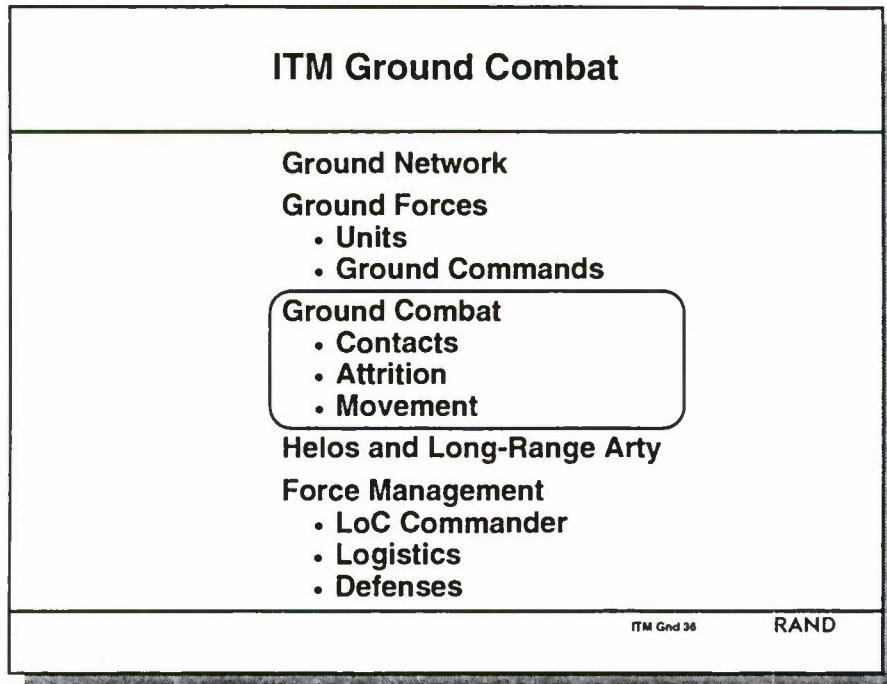
and-cmd

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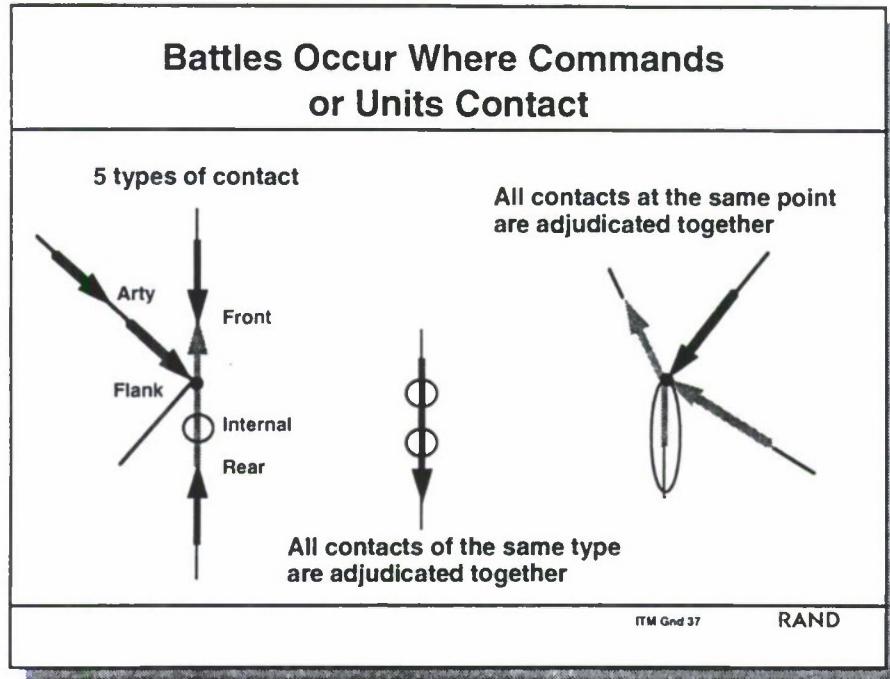
RAND

The **itm-land** display details the orientation, mission, contacts with enemy forces, and own forces of a ground command. If the initial letter of the display name is capitalized (**Itm-land**), the position and strength of each of the assigned units are also listed.

3. ITM Ground Combat—Ground Combat



We turn now to a discussion of ground combat.



The ITM adjudicates battles wherever ground commands contact ground commands or units. Each contact falls into one of five types: Front, Flank, Rear, Internal, and out-of-contact artillery fire (Arty). Internal battles occur only when a unit is overrun. Artillery battles occur only when a command that is not involved in maneuver combat comes within range of a force with artillery, typically only in the opening hours of a war. Otherwise, the out-of-contact artillery is added to the front battle before it.

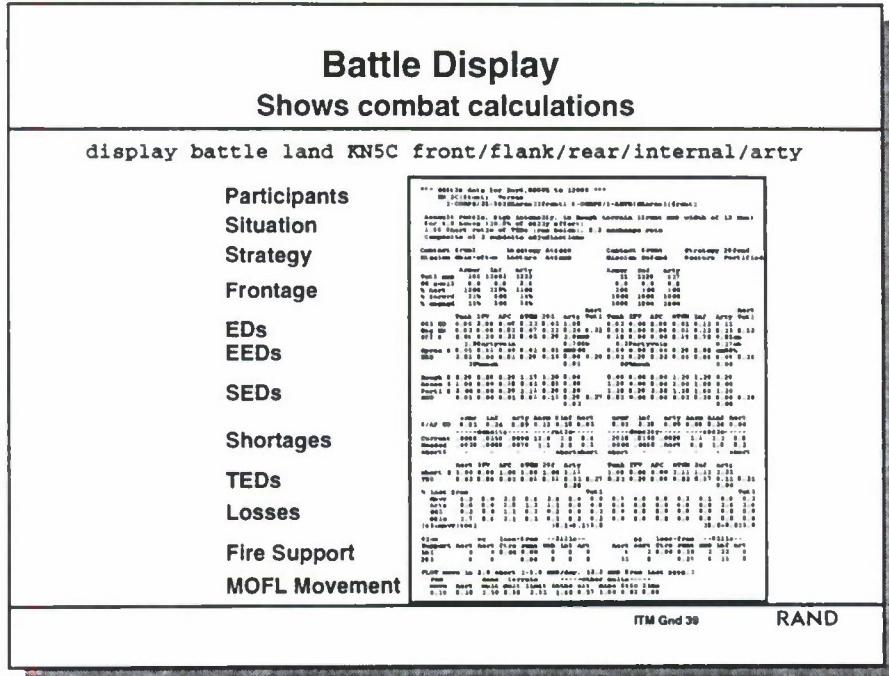
Where overlapping commands or positional units are contacted at a single place, a single battle is adjudicated for all forces contacted. Each command or positional unit is allowed to be in only one battle at each type of contact. If contacted by two enemy commands in the flank at different positions, only one battle would be adjudicated for all forces.

Missions Determine Which In-Contact Units Fight	
<u>Units With Mission</u>	<u>Fight In-Contact</u>
Front	Front
Reserve - artillery	Front
Reserve - maneuver	Rear
Reconstitute	Rear
Flank	Flank
Security	Internal

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A unit within a command initially fights in the contact corresponding to its mission, which also determines its position within the command.

One exception is the artillery units (class Arty) in reserve, which fight in frontal battles as shoulder space allows. *Shoulder space* is the average military width of the terrain. Also, an ITM module called the Battle Allocator can shift fractions of the forces in each position to meet threats from other directions. That module is explained in Section 5.



The battle display details the battles that occurred during the past period at one type of contact for a command. More than one battle may occur at the contact in a single adjudication period (or *delta*) if the list of participants, the type of terrain, or any of a number of significant inputs changes during the period. In this case, the battle display will list a separate chart for each battle and indicate the precise time period (or *sub-delta*) covered by each battle.

The display highlights the ground adjudication process, covering the combat situation and calculation of scores, losses, and MOFL movement. EEDs (Effective Equivalent Divisions) are derived from the ED scores by applying unit effectiveness and cohesion factors. SEDs (Situational EDs) also apply terrain and type-of-battle factors, and TEDs (Tactical EDs) apply combined-arms shortage factors.

Each of the sections of this display is discussed in turn to illustrate the ground combat process.

List Battle Participants and Timing

*** Battle data for Day4, 0800Z to 1200Z ***
KN_2C(front) Versus
1-CORPS/25-ID[SKorea](front) 1-CORPS/1-ARTB[SKorea](front)

Assault battle, High intensity, in Rough terrain (front has width of 12 kms)
For 4.0 hours (10.0% of daily effort)
1.26 force ratio of TEDs (see below), 6.3 exchange rate
Composite of 2 subdelta adjudications

Start and end times covered by this display
Commands and positional units in contact
Battle type, Intensity, terrain, width
Hours covered, % of daily combat effort during this time
(LANDWAR->gnd_timing)
Final force ratio of attacker to defender maneuver TEDs
Sub-deltas merged into this display

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The precise starting and ending times covered by this display are listed in the first line, and the corresponding decimal hours, in the fifth line. The parameter LANDWAR->gnd_timing specifies the percentage of effort that is put into ground combat in each period of the day. The percentage here shows how much of its daily effort the attacker is expending in the time covered. The defender is assumed to match the attacker's effort.

The list of participants shows either commands or positional units by name, and where they are contacted for this battle.

The battles part of ITM is event-driven within an established time period (the ITM "Delta-T"), which is 4 hours. For each battle across the front, the time of the next discontinuous event (e.g., terrain shift or the encounter of an opposing force) is determined, and the clock is advanced only to the closest of these events. The resulting period of time is referred to as a "Sub-Delta." If in a given sector the time division is not required, ITM aggregates the battle results from multiple Sub-Deltas; in this case, two such periods were combined.

Characterize Battle and Posture of Each Side							
Attacker		Defender					
Contact	Front	Strategy	Attack	Contact	Front	Strategy	Defend
Mission	Main-attack	Posture	Attack	Mission	Defend	Posture	
Fortified							
Strategy based on mission and situation							
<i>Attack, Breakthrough, Advance</i>							
<i>Defend, Delay, Withdraw</i>							
Battle type from opposing strategies							
<i>Assault, Meeting, Breakthrough, Unopposed</i>							
<i>Delay, Withdraw, Static</i>							
Posture of each side from battle type and defense level							
<i>Attack, Breakthrough, Moving</i>							
<i>Fortified, Prepared, Deliberate, Hasty, Delay, Static</i>							
Parameters							
LANDWAR->attk_main, attk_pin, attk_spt, attk_join - force ratio required to carry out each kind of attack mission							
				ITM Gnd 41 RAND			

The second step in ground combat adjudication is to characterize the type of battle and the posture of each side.

A strategy is chosen for each side, based on the type of contact, the assigned mission, the level of defenses, and other factors. For instance, in a front contact a defender with a defend-delay mission will defend if in fixed defenses, but will delay otherwise. In a flank contact, both sides always choose attack because the defender is inherently out of position. The three attack missions (main, support, and pin) all result in a strategy of Attack. Their difference is reflected in a separate intensity factor (high, medium, or low, respectively) that adjusts the calculated combat rates.

The battle type is determined from the choice of strategy on each side. The normal choice of attack and defend strategies leads to an assault battle, whereas the choice of both to attack, as in a flank contact, leads to a meeting battle. The battle type is overridden in two cases. It becomes *static* if the attacker-to-defender TED force ratio (explained later in this section) is below what is required to attack (parameters **LANDWAR->attk_main/pin/spt/join**). It becomes a *breakthrough* if the defender SED density falls below requirements described on the next slide.

Finally, each side's posture is determined from the type of battle and the level of defenses.

Breakthroughs Represent Catastrophic Failure of the Defense

- Occur when defender SED/km density falls below a threshold
 - LANDWAR->*brk_density*, *delay_density*, *withd_thresholds density* - thresholds in normal assault, delay, and withdrawal
- If the attacker does not have a minimum density, also require a minimum force ratio
 - LANDWAR->*brk_ratio* - required force ratio to breakthrough
 - required attacker density = required defender density \times *brk_ratio*
- Recover when defender density is above a threshold, or enter defenses
 - LANDWAR->*recv Density*
- 5% (default) one-time loss for suffering a breakthrough
 - LANDWAR->*brk_loss*, *barrier_loss* - % loss on breakthrough, or when pushed out of barrier defenses
 - LANDWAR->*brk_ex_ratio* - exchange ratio to calculate attacker loss

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RAND

A breakthrough is adjudicated in the ITM when the defender must cover more combat-usable frontage per SED than is feasible, rather than being treated as a stochastic event as would occur in the real world. In addition, the attacker must be able to sufficiently cover the frontage, or the breakthrough adjudication turns more on firepower and maneuver than on density, and the attacker must satisfy an additional force-ratio constraint.

When a breakthrough does occur, there are two procedures for capturing its effects. First, a one-time attrition penalty is assessed to the defender (LANDWAR->*brk_loss*) to reflect the results of local encirclements and collapses associated with the breakthrough that, in reality, would occur over many hours or days, but are adjudicated within a single 4-hour time step for simplicity. Second, the type of battle is changed to breakthrough, implying an exploitation phase has begun with appropriately high defender losses and a lower exchange ratio for the attacker; this phase continues until the defense is able to establish a cohesive line of defense again (assessed when the defense-capable forces at the front cover no more frontage than LANDWAR->*recv Density* per SED, or the defender falls back into fixed defenses).

An alternative kind of breakthrough occurs when a defender is pushed out of a prepared defensive position. This kind of breakthrough causes a one-time attrition to the defender (LANDWAR->*barrier_loss*) but does not transition to a breakthrough type of battle.

Frontage Restrictions Limit the Weapons Engaged					
Attacker			Defender		
	Armor	Inf	Arty		Armor
Totl wpn	302	11403	1332		25
Km avail	6.0	9.6	9.6		6.0
% used	126%	119%	116%		10%
% forwrd	31%	50%	14%		100%
% engagd	31%	50%	14%		100%

Total weapon count for each arm of all engaged units
Width available for each arm varies by terrain type
% of available width used
% able to keep up with MOFL movement
% of total weapons engaged, given above constraints

Parameters
ITM->*armor_per_km, inf_per_km, arty_per_km* - maximum # of weapons per km of terrain width that can engage
ITM->*piecemeal* - % of an overrun unit that is engaged
LANDWAR->*delay_pct, withd_pct* - maximum % of forces engaged in delay or withdraw
LANDWAR->*armor_min_fwd, infy_min_fwd, arty_min_fwd* - minimum # of weapons that can keep up with a rapidly moving MOFL

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In calculating the combat power of each side, the forces in contact for each side are limited to what will fit on the usable terrain. The width and terrain type along each link were defined earlier in the scenario with the script LANDWAR->terrain. The single km width yields separate widths of usable terrain for the three types of arms (armor, infantry, and artillery) for different terrain types. For instance, in mountains, only 20% of the set width may be usable by armor, whereas 60% is available to infantry. The norms for the allowed weapons per km are set by the parameters ITM-> *armor_per_km, inf_per_km, and arty_per_km*, to defaults appropriate to the Korean theater.

When the MOFL is moving rapidly, the forces of both sides will begin to string out along the road network in the theater. The number of weapons that can keep up with the fastest-moving MOFL is set by the parameters LANDWAR->*armor_min_fwd, infy_min_fwd, and arty_min_fwd*, to reflect the capacity of the road network. The percentage of total forces that can keep up is reported in the line "% forwrd".

Effective EDs Consider												
Unit Effectiveness and Arty Suppression						Defender						
Attacker						Mnvr			Mnvr			
Tank	IFV	APC	ATGM	Inf	Arty	Tot1	Tank	IFV	APC	ATGM	Inf	
Ttl ED	0.09	0.00	0.05	0.13	0.42	1.08	0.01	0.00	0.00	0.02	0.12	0.13
Eng ED	0.03	0.00	0.01	0.07	0.21	0.15	0.32	0.01	0.00	0.02	0.12	0.13
Eff X	0.94	0.00	0.92	0.99	0.99	1.00	cm	0.78	0.00	0.00	0.78	0.78
								0.70cb				0.85cm
Sprss X	0.95	0.95	0.95	0.91	0.91	cm55%		0.99	0.99	0.99	0.98	0.98
EED	0.02	0.00	0.01	0.06	0.19	0.08	0.29	0.01	0.00	0.00	0.02	0.09
								0.05				0.00
								60%mech				

Total EDs of all engaged units

Engaged EDs = Ttl ED x % engaged

Average effectiveness multiplier of all engaged units
 cm, cb - arty split into counter-maneuver and counter-battery fire

Suppression multiplier from enemy arty
 arty_vuln - relative vulnerability to arty
 cm - % of own arty allocated to counter-maneuver fire
 %mech - degree of mechanization of force

EED = Eng ED x EffX x SprssX (arty split into cntr_mnvr and cntr_bttry)

ITM Gnd 44

RAND

This section of the battle display reports the calculation of engaged Effective EDs (EEDs). Unit ED scores are aggregated into five categories and are totalled across the four maneuver categories.

The EDs of all forces in contact are limited to the percentage engaged, shown in the previous slide, and then are multiplied by the effectiveness calculated from a weighted average from the units in contact. The effectiveness multiplier for artillery is shown for counter-maneuver and counter-battery fire.

An additional multiplier is applied for the suppressive effects of the enemy artillery. This multiplier includes the vulnerability of the side to artillery (reported on the line above), which can range from 3.0 for attacking across a river to 0.5 for defending in fortifications, adjusted for the percent mechanization (reported on the last line).

Percent mechanization is the percentage of the vehicles on hand relative to what would be required to completely mechanize the total force. Artillery vulnerability also multiplies losses from artillery fires.

Artillery EEDs are divided between counter-maneuver and counter-battery fire, by default, in proportion to the maneuver and artillery EDs of the enemy force (described in a later slide). The percentage allocated to counter-maneuver is reported in the Arty column of the "Sprss X" line, because artillery does not explicitly suppress artillery in the model.

Situational EDs Consider Terrain, Battle Type, and Posture

Attacker							Defender						
						MnVR							MnVR
Rough X	0.90	0.00	0.90	1.17	1.20	0.90	0.90	0.00	0.00	1.20	1.20	0.90	
Assau X	1.00	0.00	0.78	0.91	0.81	0.90	1.00	0.00	0.00	1.00	1.00	0.90	
Forti X	0.90	0.00	0.90	1.17	0.90	0.90	1.20	0.00	0.00	1.40	1.40	1.20	
SED	0.02	0.00	0.01	0.07	0.17	0.06	0.27	0.01	0.00	0.00	0.03	0.16	0.09
						0.03							0.00

Terrain multipliers

Battle type multipliers
Including arty mult for days of preparation

Posture multipliers if in prepared or greater defenses

SEDs = EEDs x TerrainX x BattleX x PostureX
(arty split into cntr_mnvr and cntr_bttry)

ITM Gnd 46

RAND

This section of the battle display reports the calculation of Situational EDs (SEDs), which are derived from EEDs by multiplying with factors for terrain, battle type, and level of defenses. A defender in deliberate defenses in mixed terrain is the nominal case, with factors of 1.0. Other factors reflect the usefulness of the weapon arm relative to the standard.

In general, as terrain becomes more difficult, armor and artillery do worse, and infantry does better. Attacking armor does better in pursuits than in assaults; attacking infantry and artillery do worse. All defending arms do worse in pursuit because of the lack of a cohesive defense. All defending arms do better in higher levels of defenses, with defending infantry doing the best and attacking arms tending to do worse (excepting short-range ATGMs).

Combined-Arms Shortages Consider Platform/Anti-Platform Capabilities												
Attacker						Defender						
armor	inf	arty	Aarm	Ainf	Aart	armor	inf	arty	Aarm	Ainf	Aart	
P/AP ED	0.03	0.24	0.09	0.12	0.26	0.03	0.01	0.18	0.09	0.08	0.26	0.00
-----density-----	-----ratio-----	-----density-----	-----ratio-----									
Current	.0046	.0250	.0098	13.4	1.4	0.4	.0016	.0190	.0098	2.7	1.1	0.0
Mesdad	.0030	.0060	.0070	1.5	2.0	0.5	.0020	.0040	.0040	0.4	1.0	0.2
Short?	-	-	-	-	shortshort	short	-	-	-	-	short	

Platform and Anti-platform EDs
(SEDs totalled by platform and platform-killing categories)

Current density of PEDs and ratio of APEDs to enemy PEDs

Required density and ratio for type of battle

Parameters

LANDWAR->*armor_req_mult*, *inf_req_mult*, *arty_req_mult* - multiplier of required PED density

LANDWAR->*aarmor_req_mult*, *ainf_req_mult*, *aarty_req_mult* - multiplier of required APED ratio

ITM Gnd 46 RAND

This section of the battle display reports on the shortages of combined arms. ITM does this in two ways: (1) determining when the capability of a specific kind is insufficient, and (2) determining when a force's capability is insufficient relative to opposing capabilities. This assessment is done in three parts:

- Mapping categories of weapons into the three basic arms by platform and killing potential
- Determining whether or not a shortage exists in the weapon types or killing potential as a function of the combat situation
- Determining the multiplier associated with each shortage as a function of the combat situation.

The capability of the force in each arm is reported as Platform EDs (PEDs), and the capability against that arm as Anti-Platform EDs (APEDs). Each weapon can contribute to several categories. For instance, attacking tanks count 100% to armor and anti-armor capability, but also 80% to anti-infantry capability, and 30%, in breakthroughs only, to anti-artillery.

To prevent a shortage in an area, a force is required to have a certain density of PEDs, or ratio of APEDs to the corresponding enemy PEDs.

The analyst can modify these requirements through the parameter multipliers listed above.

Tactical ED Factors Consider Shortages															
	Attacker						Defender								
	Tank	IFV	APC	ATGM	Inf	Arty		Tank	IFV	APC	ATGM	Inf	Arty		
Short	x	1.00	0.00	1.00	1.00	2.17		1.00	0.00	0.00	1.11	1.11	1.23		
TED		0.02	0.00	0.01	0.07	0.17	0.13	0.27	0.01	0.00	0.00	0.03	0.17	0.11	0.21
							0.08						0.00		

Shortage mults:

<u>Short</u>	<u>Effect</u>
Armor	reduce own infty
Infty	reduce own armor
Arty	reduce own armor and infty
Anti-armor	increase enemy armor
Anti-infty	increase enemy infty
Anti-arty	increase enemy arty

TEDs = SEDs x ShortX

ITM Gnd 47 RAND

This section of the battle display reports the calculation of Tactical EDs (TEDs), which are derived from SEDs by multiplying by factors for combined-arms shortages. A shortage in armor, infantry, or artillery capability results in a penalty to the other weapons, based on the size of the shortage (for example, insufficient artillery in an assault makes the attacking armor and infantry less effective). A shortage in killing capability (anti-armor, anti-infty, anti-arty) results in a bonus to the corresponding enemy weapons, also based on the size of the shortage.

Close-Combat Adjudication

- Defender loss rate and exchange rate calculated from attacker-to-defender TED force ratio
 - modified by intensity factors for battle type, defense level, attacker preparation
- Attacker losses are defender losses x exchange rate
- Loss distribution among weapon categories varies by battle type

Parameters

LANDWAR->low_ddr, high_ddr - multiplier of defender loss rate at low/high intensity

LANDWAR->low_er, high_er - multiplier of exchange rate at low/high intensity

ITM->att_mult - multiplier of attrition from maneuver combat

ITM Gnd 48

RAND

Losses from close combat are calculated from the attacker-to-defender ratio of TEDs and are modified by factors for the intensity of combat. The defender's loss rate and exchange rate of attackers for defenders are calculated directly; the attacker's losses are simply the defender's losses multiplied by the exchange rate.

This calculation results in an overall ED loss for each side, which is distributed among the weapons on each side according to a casualty distribution depending on battle type. In assaults, armor suffers more heavily than infantry, with the attacker's armor suffering greater attrition than that of the defender.

The parameters listed above allow multiplication of the defender loss rate or exchange rate for each intensity of attack (missions Main-attack, Support-attack, and Pin-attack), or the multiplication of all close-combat attrition.

Adjudicating Direct-Support Artillery

- Kills based on standard TEDs per km of frontage
 - modified by the difference from standard arty TEDs and target density
 - varied for tank, other-armor, infantry, and arty targets
- Allocated against maneuver or artillery by one of:
 - proportion of enemy maneuver and arty EDs (weighted by **LANDWAR->cntr_batt_wgt**)
 - analyst (using **LANDWAR->cntr_batt_pct**)

Parameters

LANDWAR->arty_range_kms - kms from command's front that arty can engage

LANDWAR->init_art_prep - days of preparation for artillery at D-day

LANDWAR->cntr_batt_wgt - weight accorded enemy arty when allocating

LANDWAR->cntr_batt_pct - % of arty allocated against arty (overrides **cntr_batt_wgt**)

ITM->thin_defense - if prepared or fortified defenses give net protection from arty

ITM Gnd 49

RAND

Losses from supporting artillery fire are calculated separately from maneuver combat, but are based on the TED score for artillery derived along with the TED scores of the maneuver weapons in the steps described previously (except for long-range artillery). Artillery adjudication is not based on a force ratio of TEDs, but on a number of weapons killed by a relative artillery score firing against a relative target density. Kills and standards vary for each of several target categories.

The ITM explicitly allocates artillery fire between maneuver and artillery weapons. By default, this allocation is proportional to the total enemy ED strength in these categories. Enemy artillery can be accorded more or less weight through the parameter **LANDWAR->cntr_batt_wgt**. Alternatively, the parameter **LANDWAR->cntr_batt_pct** allows the analyst to set the allocation to a fixed percentage.

Percentage of Losses from Maneuver, Arty, and Fire Support														
Attacker							Defender							
% loss from	Tank	IFV	APC	ATGM	Inf	Arty	Totl	Tank	IFV	APC	ATGM	Inf	Arty	Totl
Mnvr	2.2	0.0	2.2	2.4	2.4	0.0	0.9	0.7	0.0	0.0	0.5	0.5	0.0	0.3
Arty	0.6	0.0	1.5	1.3	1.3	0.4	0.8	0.4	0.0	0.0	0.8	0.8	2.6	1.6
BAI	0.2	0.0	1.3	0.2	0.2	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Helo	1.7	0.0	2.1	0.2	0.3	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(c3/mnvr)totl							(7.2/6.1)2.0						(0.9/0.9)1.9	

% ED loss in each weapon category and total from

Mnvr - maneuver combat
Arty - divisional artillery
Ovrn - defending forces overrun by the FLOT
LRArt - long-range artillery
CAS/BAI/AI/Helo - air-to-ground sorties

(c3<mnvr)totl
totl total % loss
mnvr % loss of engaged maneuver forces from maneuver combat
c3 total % loss of maneuver forces with C3 mults for fire support

ITM Gnd 50 RAND

This section of the battle display reports the percentage of ED losses from all sources for the time period covered. Losses from long-range artillery and air-to-ground sorties are not calculated as part of ground combat adjudication, but are reported here since they enter into the FLOT movement calculation described later in this section. Losses from overrun are the fraction of the defender's forces that are unable to keep up with the FLOT because of congestion on the road network (reported earlier in this section in the frontage restrictions slide). The "Totl" column shows the total percentage loss from each source. In the above example, it is generally significantly less for the attacker than the percentage losses for the individual maneuver weapon categories because the attacking force is about one-half artillery (by ED score), which suffers little or no attrition and dilutes the total percentage loss.

The total percentage loss is reported in three forms: (1) "totl" is the total loss of all forces from all sources, (2) "mnvr" is the loss to engaged maneuver forces from maneuver combat only (the defender and attacker loss rates calculated in maneuver combat adjudication), and (3) "c3" is the loss of maneuver forces from all sources, with losses from fire support weighted for C3 effectiveness. This last factor is used in the FLOT movement calculations described later in this section.

Fire Support Summary														
Attacker							Defender							
Fires	eq	loss-from	--kills--				sq	loss-from	--kills--					
Support	sort	sort	ftrs	sams	vsh	inf	art	sort	sort	ftrs	sams	vsh	inf	art
BAI	0	0	0.00	0.00	0	0	0	4	3	0.00	0.10	2	22	0
Hsl	0	0	0.00	0.00	0	0	0	11	8	0.27	0.31	6	31	0

Any of LR-Arty, CAS, BAI, AI, or Helo
Sorties or volleys supporting the side
Equivalent sorties or volleys
Sortie losses from air-to-air and ground-to-air defenses
Kills of enemy vehicles, infantry, and artillery weapons

ITM Gnd 51 RAND

This section of the battle display reports the fire support for each side, which can be volleys of long-range artillery or ground attack sorties of Close Air Support (CAS), Battlefield Air Interdiction (BAI), Air Interdiction (AI), or attack helicopters. It can be more support than has actually been allocated to the commands in the battle, if support allocated to other commands that are not engaged attack units here.

MOFL (FLOT) Movement Rate Calculation

FLOT move in 4.0 hours (-1.0 kms/day, 15.7 kms from last prep.) kms dens terrain other mults move base mult mult limit intne air fric mine time 0.10 0.18 1.50 0.50 3.33 1.40 0.57 0.93 1.00 0.60							
Time covered, approximate daily rate, distance from last prepared position							
Base movement rate calculated from defender, attacker loss rates (including losses from arty and fire support)							
Defender density multiplier							
Terrain multiplier							
Terrain movement limit							
Attacker intensity multiplier							
Air-to-ground delay mult. (from air support and long-range arty strikes)							
Combat friction mult. (from ratio of attacker EDs to defender ED loss)							
Minefield mult.							
Ground timing mult. (from level-of-effort in period, LANDWAR->gnd_timing)							
Kms move = ((base x dens mult x trrn mult) < trrn limit) x other mults							
ITM Gnd 52	RAND						

Finally, this section of the battle display reports the calculation of MOFL movement. In this and other displays, the MOFL is sometimes referred to as the FLOT (Forward Line of Own Troops).

The base rate is calculated from the ratio of the defender's loss rate to the attacker's loss rate from all sources, including divisional artillery and all forms of fire support. Losses due to fire support are weighted by parameters ITM->lr_oas_mult, and lr_art_mult to reflect the ability to apply them where and when most needed.

A series of multipliers and limits is applied to the base rate, proceeding from left to right, to achieve the final rate reported at the beginning of the line. Here are some notes on these numbers.

- The terrain movement limit is not a flat cap but is approached asymptotically.
- Each fire support sortie or volley causes a movement delay, in addition to the effects of the kills, in the calculation of the base rate. This is explained later in Section 4, on fire support adjudication.
- Combat friction reflects the fact that units do not advance much when fighting. The multiplier is based on the ratio of attacker EDs to defender ED losses, or roughly the amount of killing done by each unit attacker.
- The delay assessed by minefields is explained later, in Section 5.
- The timing multiplier is greater or less than one when the percentage of the daily combat effort expended in this period (LANDWAR->gnd_timing) is different from what would be average (~17%).

FLOT Movement Parameters

LANDWAR->*low_move, high_move* - multipliers of movement at low/high combat intensity

LANDWAR->*min_density, hold_density* - defender TED density below which movement is 150% normal and above which movement is 25% normal

LANDWAR->*no_adv* - whether an unopposed defender can advance to objective

ITM->*vel_mult* - general movement multiplier

ITM->*vel_lim_mult* - multipliers of the terrain cap on movement

ITM->*lr_oas_mult, lr_art_mult* - multipliers of contribution of kills by air-to-ground and long-range arty fire support to MOFL movement (notionally due to C3 effectiveness at directing fires where needed)

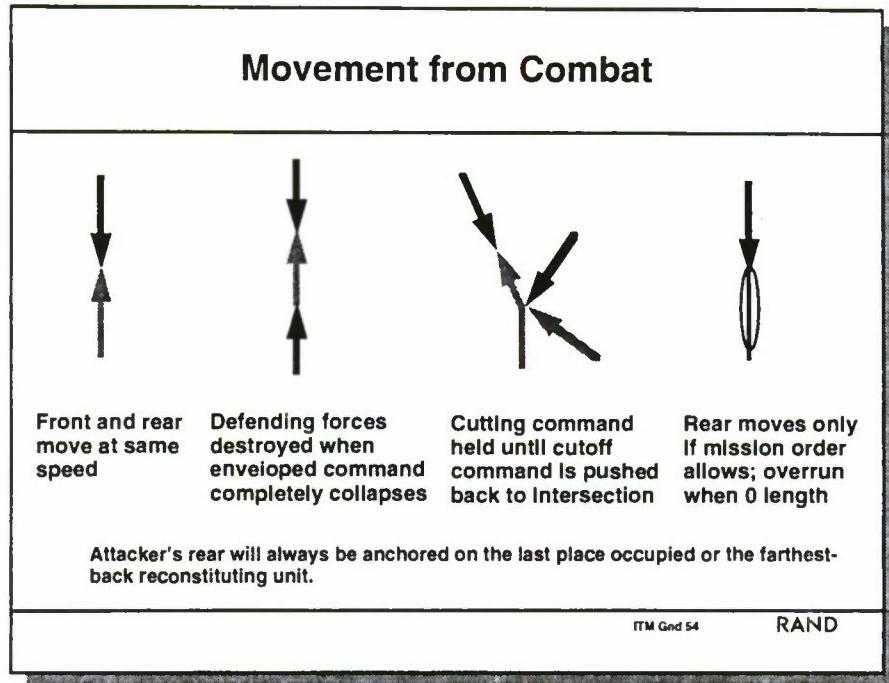
LOC->*max_speed, min_speed* - max/min speeds on link; max speed drops to min as refugee parameter rises to 100%

REGION->*refugees* - current extent of refugee problem (0-100%)

ITM Gnd S3

RAND

These are the parameters affecting MOFL movement. Details on the parameters are included in Appendix J.



MOFL movement is adjudicated in any battle that does not involve a flank contact. In the simple case of two mobile commands with a frontal contact, the front and rear of the defending command and the front of the attacking command move at the same rate. The rear of an attacking command always covers the last network place taken or the last reconstituting unit. The rear of a defending positional command always ends at its last positional unit.

When the rear of a command is in contact with the front or rear of another command, it will move independently according to the rear battle results. A command that is compressed to zero length between two enemy commands is eliminated and all of its units overrun.

Any command contacting the flank of another command is not allowed to advance. It will draw forces from any frontal battle the defending command is involved in and will thus almost always cause the command to be pushed back. It is possible for commands to become gridlocked if the flanked command wins its frontal battle.

The rear of a positional unit (whether or not in a positional command) moves only at the rate allowed in the mission order that placed it into defenses. The front moves at the adjudicated MOFL rate, and, if the unit is compressed to "zero" length, it is overrun by the attacking command.

Battle Summary Display														
Summarizes all battles in a theater														
display battle sum CFCK														
MOFL penetration and velocity Total EDs Engaged maneuver and arty EDs														
Participant	Plot/Move	% loss	Posture	Ttl ED	Engaged	%	Support	Trnn/Wd	Intnsty	Cntct	AG	Ha	Ar	
KN_1W	27.3	1.3	Attack	0.8	0.4	0.2	90	0.6	0	0	0	Rough	12	Front
2CORPS/1ID+	0.1	0.9	Prepare	0.3	0.2	0.0	57	0.3	5	0	0	Med	Front	
KN_5C	18.2	0.3	Attack	1.5	0.6	0.2	90	0.9	12	8	0	Rough	10	Front
5CORPS/5ID+	0.1	4.9	Hasty	0.5	0.4	0.1	57	0.3	5	0	0	High	Front	
KN_1W	27.3	1.3	Attack	0.3	0.2	0.1	98	0.3	0	0	0	Mount	15	Front
1CORPS/1ID	0.1	0.9	Prepare	0.1	0.1	0.0	83	0.0	0	0	0	Med	Flank	

Average unit effectiveness
Tactical EDs
Air-to-ground sorties and LR-artillery volleys
Terrain type and width, intensity

ITM Gnd 55 RAND

The battle summary display gives an overview of the ongoing battles in the theater. To allow some comparison between the battles, if the battle did not cover the entire last 4-hour adjudication period, the losses and movement are reported as if it did. This reporting is occasionally misleading if a short, extreme event occurred at the period's end.

hist-gnd Display							
Inventory of assigned weapons and cumulative losses							
display hist-gnd CFCK		initialization day		current day			
Type of Weapon ED							
	Day5	Surviving	M+F+K-Killed	Fixed/Issued	Assigned	Day9	Day9
Tank	2090	1.934	52	0.022	10	0.004	0
IFV	700	0.442	0	0.000	0	0.000	700
APC	1607	0.439	0	0.000	0	0.000	1607
Td_Arty	4818	1.936	489	0.228	49	0.023	0
TOTAL EDs	17.651				0.069	0.000	16.924
OIR_ADef	683	0.142	39	0.006	2	0.000	0
Atk_Helo	512	510.2	7	7.1	0	0.0	505
Attrition Analysis:							
Type Percent of Total Attrition by Cause of Loss							
Weapon	Gnd-Cbt	AtkHelo	CAS	BAI	AI/AIR	LRA	Mines
Tank	83.1%	1.02%	0.75%	0.08%		15.00%	
Sr_ATGM	98.53%	0.74%	0.67%	0.05%			
Cumulative Kills by: Enemy Weapons Killed							
	Armor	Infantry	Artillery	All-Other			
Attack Helos	75.9	939.5			10.4		
LR Artillery	27.8	271.2	1.0			3.3	

ITM Gnd 64

RAND

The hist-gnd display shows cumulative weapon losses for the command specified from the time that the display was initialized, using the FORCE->his_init script (described on the next slide). The two "Surviving" columns show total weapons for all assigned forces anywhere in the world; "M+F+K-Killed" lists all killed weapons (mobility, firepower, and non-repairable kills); "Fixed/Issued" lists all weapons repaired locally, repaired in theater repair and returned later, or issued from War Reserve Materiel stocks; and "Assigned" lists all weapons of forces assigned to the command in the time period (negative if unassigned).

In the above example, the display was initialized on day 5 and requested on day 9.

his-init
Initialization for hist-gnd and hist-air displays

ground commands air commands

```
set force his-init CFCK KSCC KS1W KS5W 7USAF ROKAF end
```

- Lists commands to be initialized (or reinitialized)
- Zeros out counters for cumulative losses

ITM Gnd 57 RAND

The FORCE->his_init script initializes the accounting for the hist-gnd and hist-air cumulative losses displays. The theater command, ground commands, and air commands for which losses are tracked must be listed in the script. In general, this script will be issued on D-day, unless the analyst wishes to track the assignment of forces to the theater.

4. ITM Ground Combat—Helos and Long-Range Arty

ITM Ground Combat

- Ground Network**
- Ground Forces**
 - Units
 - Ground Commands
- Ground Combat**
 - Contacts
 - Attrition
 - Movement
- Helos and Long-Range Arty**
- Force Management**
 - LoC Commander
 - Logistics
 - Defenses

ITM Gnd 58 RAND

We turn now to a discussion of attack helicopters and long-range artillery.

Attack Helicopters Are a Type of Ground Unit Weapon

- Number and score given in *ground.sec* for each unit
 - Score divided by a standard to get equivalent sorties
- Can be in maneuver units or in separate ground forces
 - Maneuver units with helo components fight normally
 - Heli-only units are destroyed if contacted by enemy
- Fly sorties independent of maneuver combat
- Consume explicit munitions

ITM Gnd 59

RAND

Attack helicopters are treated as one of the 14 types of weapons carried by ground units. Only the number and score of the helicopters in a unit are known—the names of different helicopter types are not kept in the database. Instead, helicopter characteristics can be set for all units in a command through parameters that are listed in Appendix Z.

The helicopter score is its sortie effectiveness relative to a standard (defined in *ground.sec* after the keyword "HELO"). The score divided by the standard gives its effectiveness in equivalent sorties.

The unit type "HelB" is used for brigades that are composed only of helicopters. When assigned to ground commands, helicopter brigades are always held in reserve. They are destroyed if contacted on their own by an opposing maneuver unit. Units with helicopters in addition to their maneuver weapons are treated as normal maneuver units and can participate in maneuver combat.

Helicopters in a unit fly daily sorties against enemy units as directed by the unit's mission orders. These sorties are similar to the airwar's air-to-ground sorties in planning and execution. The orders for employing attack helicopters are described on the next page.

Helicopter munitions are represented as helo-sorties; one helicopter munition is consumed for every sortie flown. Explicit munitions (also used by aircraft and long-range artillery) are counted only by region and owner. In other words, any helicopter in South Korea would draw from the regional stockpile, but only from supplies owned by its own government. The resupply display shows current totals of explicit munitions; the SUPPLY->atk_helo script can create or destroy the munitions. Initial stockpiles of explicit munitions are defined in the file *weapon2.sec*.

GndMission Order																				
Specifies supported or attacked command																				
<u>Helo-support</u> - support a command with a number of sorties/day																				
<u>Helo-strike</u> - attack a command with a number of sorties once																				
<table border="1"><thead><tr><th><i>cmd</i></th><th><i>mission</i></th><th><i>unit</i></th><th><i>owner</i></th><th><i>command</i></th><th><i>sorties</i></th><th><i>supported</i></th></tr></thead><tbody><tr><td>order KS5C gndmis</td><td>helo-support</td><td>1-MXD</td><td>US</td><td>KS-4W</td><td>40</td><td></td></tr></tbody></table>							<i>cmd</i>	<i>mission</i>	<i>unit</i>	<i>owner</i>	<i>command</i>	<i>sorties</i>	<i>supported</i>	order KS5C gndmis	helo-support	1-MXD	US	KS-4W	40	
<i>cmd</i>	<i>mission</i>	<i>unit</i>	<i>owner</i>	<i>command</i>	<i>sorties</i>	<i>supported</i>														
order KS5C gndmis	helo-support	1-MXD	US	KS-4W	40															
<table border="1"><thead><tr><th><i>cmd</i></th><th><i>mission</i></th><th><i>unit</i></th><th><i>owner</i></th><th><i>command</i></th><th><i>sorties</i></th><th><i>targeted</i></th></tr></thead><tbody><tr><td>order KS5C gndmis</td><td>helo-strike</td><td>1-MXD</td><td>US</td><td>KN-2C</td><td>40</td><td></td></tr></tbody></table>							<i>cmd</i>	<i>mission</i>	<i>unit</i>	<i>owner</i>	<i>command</i>	<i>sorties</i>	<i>targeted</i>	order KS5C gndmis	helo-strike	1-MXD	US	KN-2C	40	
<i>cmd</i>	<i>mission</i>	<i>unit</i>	<i>owner</i>	<i>command</i>	<i>sorties</i>	<i>targeted</i>														
order KS5C gndmis	helo-strike	1-MXD	US	KN-2C	40															
<ul style="list-style-type: none">Units may have multiple helo missions to allocate sorties among multiple commandsSorties not allocated to specific missions are flown in support of the unit's assigned command (if that command is oriented)																				
ITM Gnd 60				RAND																

A ground unit with helicopters can be given one or more special missions that direct its helicopter attacks.

The helo-support mission specifies a number of sorties to be flown each day to support a named command, while the helo-strike mission specifies a number of sorties to be flown as a one-time requirement to attack a named command. Multiple missions of each type can be assigned in order to allocate sorties among several commands, but strike missions are resourced first. Any sorties not dedicated by mission orders are automatically flown in support of the unit's assigned command if the command is oriented. Therefore, attack helicopters in a unit assigned to a theater command (e.g., CFCK) will fly only helo-strike and helo-support missions. The unit receiving the mission does not have to be within the supported command's orientation, but it must be within range of the command when the sorties are flown.

Helo Sorties Are Planned Once Each Day

- Planned at 0000Z hours for the entire day
- Changed guidance affects only next day's planning
- Sorties in each period planned according to the percent-per-period timing

```
set helos CFCK hel-timing 0 10 40 30 20 0
%-per-period      Percentage of assigned command's total helo
sorties flown in each 4-hour period
```

Parameters

HELOS->*hel_sort* - sortie rate per day

HELOS->*wx_sort_pct* -percentage multiplier of sortie rate due to weather

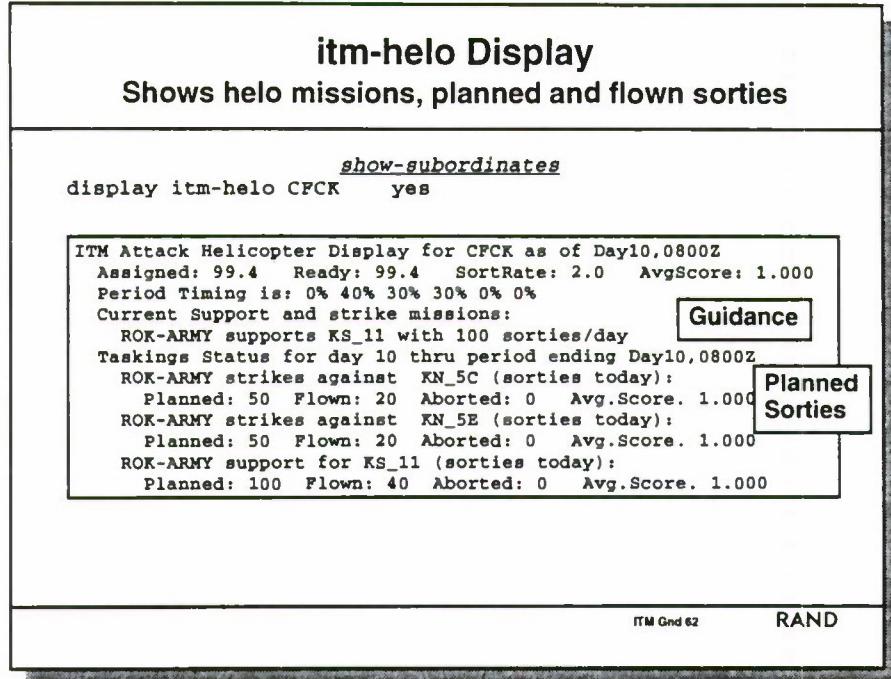
ITM Gnd 61

RAND

All helicopter sorties are planned once each day at the beginning of the day, according to the individual unit's missions and the timing guidance. Changes to guidance will not have an effect until the following day's sorties are planned.

The parameter HELOS->hel_timing specifies the percentage of a command's sorties to be flown in each 4-hour period of the day. As with air-to-ground sorties, the individual ground unit's target is not chosen until the sortie is actually flown.

The helicopter sortie rate is set by the parameter HELOS->hel_sort and is multiplied by HELOS->wx_sort_pct, representing weather effects.



The itm-helo display lists the guidance given to and sorties planned for units assigned to the specified command.

Sorties are not broken down by period but are listed as total planned for the day, total flown to this point, and total aborted. Sorties will abort if they cannot find a viable target in range or do not have munitions. Target criteria are listed in the following slide.

Only the currently active, explicitly issued missions are listed under the current missions section. Because this display was listed at 0800 hours, the strike mission against KN_5C that is shown in the taskings section is no longer shown as a current mission. It was cleared from the list of current missions once it began executing, because it is a one-time strike. Note that, according to the period timing, only 40%, or 20 out of the planned 50 sorties, has been flown by 0800 hours.

Helo Target Selection Is Similar to CAS Targeting

- Chosen from frontal units in contact with the supported command, or in the attacked command
 - Within HELOS->*hel_range* kms of the helo unit
 - Within HELOS->*flot_dist* of the supported command
 - Surviving vehicles greater than HELOS->*hel_req_arm*
- Artillery in targeted unit is attacked with fraction HELOS->*helo_arty* of the sorties
- Vehicles, infantry, and air defense weapons are attacked in proportion to their numbers in the unit
 - Infantry weapons are divided by ITM->*infty_alloc*
- LANDWAR->*hel_target* can override default targeting

ITM Grd 63

RAND

The ground unit targets for helicopter sorties are chosen according to rules similar to those for CAS sorties.

Targets for sorties supporting a command are selected only from the units engaged with the supported command. Targets for sorties striking a command are selected from the frontal forces of the command. The target unit must also be within HELOS->*hel_range* kms (direct line) of the unit owning the helicopters or within HELOS->*flot_dist* of the front of the supported command if they are supporting a command, and must have more vehicles than HELOS->*hel_req_arm*.

Parameter HELOS->*helo_arty* sets the fraction of sorties attacking a unit that is allocated to attack enemy artillery weapons. The remaining sorties are allocated among the armor and infantry weapons in proportion to their number in the unit. Infantry weapons are divided by ITM->*infty_alloc*.

Just as the default CAS targeting mechanism can be overridden, the default attack helicopter targeting can be overridden by specifying an enemy unit or command, using the parameter LANDWAR->*hel_target*.

Effect of Heli Attacks on Ground Units

- Weapons killed per equivalent sortie specified for target postures *attack, defend, delay, move*

Parameters

ITM->*vehicle_kills, arty_kills* - vehicle and weapons killed per sortie

ITM->*infty_kills* - multiplier of ITM->*vehicle_kills* for infantry weapons killed

ITM->*jstars_kills* - multiplier of air-to-ground kills when a JSTARS is flying

LANDWAR->*hel_artloss* - overrides theater arty kills per sortie for a single command

HELOS->*night_kill* - multiplier of helo kills during night periods

HELOS->*wx_kill_pct* - multiplier of air-to-ground effects due to weather

CMDGOV->*helo_mult* - multiplier of helo effectiveness

- Unit is delayed in movement by a number of hours

ITM->*ed_delay_hours* - hours a one-ED force is delayed per sortie

- Delivery of a number of days of supply is disrupted

ITM->*dos_disrupt* - days of supply not delivered per sortie

ITM Gnd 84

RAND

The weapons killed per equivalent sortie are set independently for four aggregate ground force postures and for three aggregations of targeted ground force weapons (ITM->*vehicle_kills, infty_kills, arty_kills*). Infantry kills are given as a multiplier of vehicle kills. Helicopters have additional effectiveness multipliers for night operations (HELOS->*night_kill*, periods 6, 1, and 2) and weather (HELOS->*wx_kill_pct*).

In addition to causing equipment losses, air-to-ground attacks also slow the advance of the attacking ground force's command, given as a number of hours' delay for an equivalent sortie attacking each equivalent division (ITM->*ed_delay_hrs*). The command cannot, however, be reduced below a minimum km-per-day speed (ITM->*min_flot_kpd*).

In addition to causing losses, helo attacks prevent a number of days of supply per equivalent sortie (ITM->*dos_disrupt*) from being delivered.

Unit Air Defense Against Helos

- Standard kill rate is adjusted for divergence from standard ground unit SED score.

Parameters

HELOS->hvuln_atk, hvuln_def - fraction of helo sorties killed by enemy when supporting an attacking command and the target size is hvuln_base tactical equivalent divisions (SEDs)

HELOS->hvuln_base - SEDs of standard target on which the parameters hvuln_atk and hvuln_def are based

HELOS->night_vuln - multipliers of helo losses during night periods

ITM Gnd 85

RAND

Helicopter losses from ground-to-air defenses are specified as a standard loss rate against a ground unit of standard situational equivalent division (SED) strength. The actual losses vary as the air defense strength of the attacked unit varies from the standard. The SED score includes the equivalent division (ED) score of the unit's air defense weapons, but not the scores of infantry or artillery weapons. Also, because the SED score is used, terrain- and battle-type modifications to the unit's strength are included.

Long-Range Artillery Are Optional Ground Unit Weapons

- LR-artillery types defined in *ground.sec*
 - name (*140mm-MRL*, *240-mm-MRL*, *ATACMS*)
 - kms range
 - ammo per volley
 - up to 4 load definitions
 - munition type
 - score (in equivalent volleys)
- Each ground unit may have two types of LR-Arty
- Fires are adjudicated separately from maneuver combat
- Each volley consumes explicit munitions

ITM Gnd 66

RAND

In the ITM, *long-range artillery* are those artillery systems that should be explicitly targeted because they are able to fire across corps sectors. The database with JICM 1.0 includes only MRLSs and ATACMSs; however, the analyst can easily define others.

A long-range artillery system is defined by entering the system type in *ground.sec*, specifying its possible munitions in *weapon.sec*, and giving it to specific units as an optional weapon, also in *ground.sec*.

Long-range artillery in a unit fires volleys against enemy units as directed by the unit's mission orders (shown on the next page). These fires are similar to the airwar's air-to-ground strikes in planning and adjudication. The maneuver and regular artillery components of the unit participate in maneuver combat independently of the unit's long-range artillery fires.

Long-range artillery munitions are represented as individual rounds; the number consumed per volley is found in the weapon definition. Explicit munitions (also used by aircraft and helicopters) are counted only by region and owner. In other words, any long-range artillery in South Korea would draw from the regional stockpile, but only from supplies owned by its own government. The resupply display shows current totals of explicit munitions; the SUPPLY->*weapon_type* script can create or destroy the munitions. Initial stockpiles of explicit munitions are defined in the file *weapon2.sec*.

GndMission Order
Specifies supported or attacked command

Arty-support - support a command with a number of volleys/day

Arty-strike - attack a command with a number of volleys once

<i>cmd</i>	<i>mission</i>	<i>unit</i>	<i>owner</i>	<i>command</i>	<i>volleys</i>	<i><u>supported</u></i>
order KS5C gndmis	arty-support	1-MXD	US	KS-4	40	40

<i>cmd</i>	<i>mission</i>	<i>unit</i>	<i>owner</i>	<i>command</i>	<i>volleys</i>	<i><u>targeted</u></i>
order KS5C gndmis	arty-strike	1-MXD	US	KN-2C	40	40

- Firing command must be oriented on the network and in range
- Units may have multiple arty missions to allocate volleys among multiple commands
- Volleys not allocated to specific missions are fired in support of the unit's assigned command

ITM Gnd 67 RAND

In addition to its mission pertaining to maneuver combat, a ground unit with long-range artillery can be given one or more special missions that direct its fires.

The arty-support mission specifies a number of volleys to be fired each day to support a named command, and arty-strike specifies a number of volleys to be fired as a one-time requirement to attack a named command. Multiple missions of each type can be assigned in order to allocate fires among several commands, but strike missions are resourced first. Any volleys not dedicated by mission orders are automatically fired in support of the unit's assigned command. The unit receiving the mission does not have to be within the supported command's orientation, but it must be within range of the command when the volleys are fired.

LR-Arty Volleys Are Planned Once Each Day

- Planned at 0000Z hours for the entire day
- Changed guidance affects only next day's planning
- Volleys in each period planned according to the percent-per-period timing

	<u>%-per-period</u>
set arty CFCK art-timing 0 10 40 30 20 0	
%-per-period	Percentage of assigned command's total lr-arty volleys fired in each 4-hour period

ITM Gnd 68

RAND

All volleys are planned once each day, at the beginning of the day, according to the individual unit's missions and the timing guidance. Changes to guidance after time 00:00 will not have an effect until the following day's volleys are planned.

The parameter ARTY->art_timing specifies the percentage of each mission's volleys to be fired in each period of the day. As with air-to-ground sorties, the individual ground unit's target is not chosen until the volley is actually fired.

itm-arty Display

Shows arty missions, planned and fired volleys

show-subordinates
display itm-arty CFCK yes

ITM Long Range Artillery Dieplay for CFCK as of Day5,0000Z 140mm-MRL Assigned: 6.0 Ready: 6.0 Volley/Wpn/Day: 5 Load-0: 40 MRL_T1 (score: 1.00) ammo for 195 volleys O/H Load-1: 40 MRL_T2 (score: 0.75) ammo for 245 volleys O/H Period Timing is: 0% 40% 30% 30% 0% Current support and strike missions: 1-CORPS/1-SPT strikes KS_1W with 5 volleys/day of 140mm-MRL/MRL-T2 Taskinge Statue for day 5 thru period ending Day5,0000Z 1-CORPS/1-SPT 140mm-MRL/MRL_T2 volleeye striking KS_1W: Planned: 5 Shot: 0 Aborted: 0 Avg.Score. 0.750 1-CORPS/1-SPT 140mm-MRL/MRL_T1 volleys supporting KN_5C: Planned: 25 Shot: 0 Aborted: 0 Avg.Score. 1.000	Guidance	Planned Volleys
--	-----------------	------------------------

ITM Gnd 69 RAND

The itm-arty display lists the guidance given to and volleys planned for units assigned to the specified command.

Volleys are not broken down by period but are listed as total planned for the day, total fired to this point, and total aborted. Volleys will abort if they cannot find a target in range or do not have munitions. Target criteria are listed on the following slide.

Only the currently active, explicitly issued missions are listed under the current missions section. Because this display was listed at 0000 hours, the strike mission against KS_1W is still listed as a current mission. It will be cleared from the list of current missions once it begins executing. Also, because the tasked 25 volleys supporting KN_5C are not listed as a current mission, we know that they were not ordered with an explicit arty-support mission but were automatically allocated by the model.

LR-Arty Target Selection Is Similar to BAI Targeting

- Targets chosen from any but frontal units within maximum distance

Parameters

`AIRWAR->bai_bck_kms` - maximum distance of BAI targets from supported command

`AIRWAR->bai_fwd_kms` - distance below which BAI targets are preferred

`ARTY->ira_req_arm` - minimum number of vehicles in an enemy unit for it to be a target

- All weapons are attacked in proportion to their numbers in the unit

– Infantry weapons are divided by `ITM->infty_alloc`

- `LANDWAR->art_target` can override default targeting

ITM Gnd 70

RAND

The ground unit targets for long-range arty volleys are chosen according to rules similar to those for BAI sorties.

Targets for sorties supporting a command are selected from the units within a maximum distance (`AIRWAR->bai_bck_kms`) of the front of the supported command. Targets for sorties striking a command are selected from any but the frontal forces of the command. The target unit must also be within the defined range (direct line) of the unit owning the long-range arty and have more vehicles than `ARTY->ira_req_arm`.

Equivalent volleys attacking a unit are allocated among the armor, infantry, and artillery weapons in proportion to their number in the unit, with infantry weapons divided by `ITM->infty_alloc`.

Just as the default BAI targeting mechanism can be overridden, the parameter `LANDWAR->art_target` can be used to override the default targeting by specifying an enemy unit or command.

Effect of Air-to-Ground and LR-Arty Attacks on Ground Units

- Weapons killed per equivalent volley specified for target postures *attack, defend, delay, move*

Parameters

ITM->*vehicle_kills, arty_kills* - vehicle and weapons killed per volley

ITM->*infty_kills* - multiplier of ITM->*vehicle_kills* for infantry weapons killed

LANDWAR->*Ira_artloss* - overrides theater arty kills per sortie or volley for a single ground command (can reflect lower vulnerability of artillery sheltered in the forward area)

CMDGOV->*deep_fire* - multiplier of Ir-arty effectiveness (not currently used)

- Unit is delayed in movement by a number of hours

ITM->*ed_delay_hours* - hours a one-ED force is delayed per equivalent sortie or volley

- Delivery of a number of days of supply is disrupted

ITM->*dos_disrupt* - days of supply not delivered per equivalent sortie or volley

ITM Grnd 71

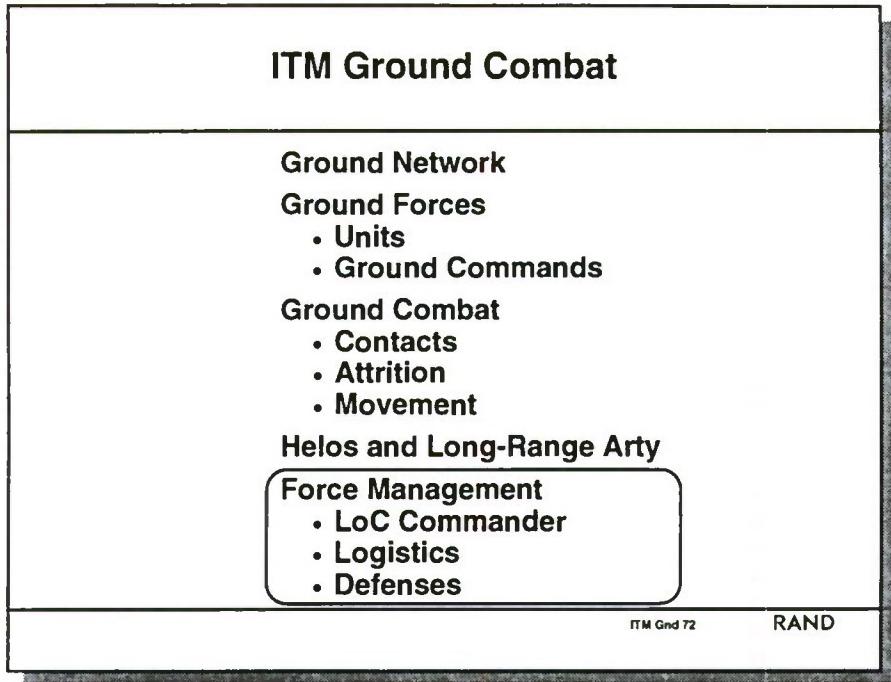
RAND

The weapons killed per equivalent volley are set independently for each aggregate ground force posture (via ITM->*vehicle_kills, infty_kills, arty_kills*). Infantry kills are given as a multiplier of vehicle kills. The effectiveness multiplier CMDGOV->*deep_fire* is included but is not used in the 1.0 version of the JICM.

In addition to causing equipment losses, long-range artillery attacks also slow the advance of the attacking ground force's command, given as a number of hours' delay for an equivalent volley attacking an equivalent division (ITM->*ed_delay_hrs*). The command cannot, however, be reduced below a minimum km-per-day speed (ITM->*min_flot_kpd*).

In addition to causing losses, such attacks prevent a number of days of supply per equivalent volley (ITM->*dos_disrupt*) from being delivered.

5. ITM Ground Combat—Force Management



We turn now to a discussion of the management of ground forces, covering rotation of missions within a ground command, logistics, and constructed defenses.

LoC Commander Model Manages Reserves and Reconstituting Forces

- Commits reserves to fit the terrain width
- Replaces units below set cohesion with reserves
 - LANDWAR->*attk_replace, dfnd_replace*
- Drops units below set cohesion into reconstitution
 - LANDWAR->*attk_pull, dfnd_pull*
- Digs-in broken defending units to be overrun
 - Occurs at cohesion level LANDWAR->*force_break*
- Shifts reconstituting units above set cohesion to reserves
 - LANDWAR->*attk_reconst, dfnd_reconst*

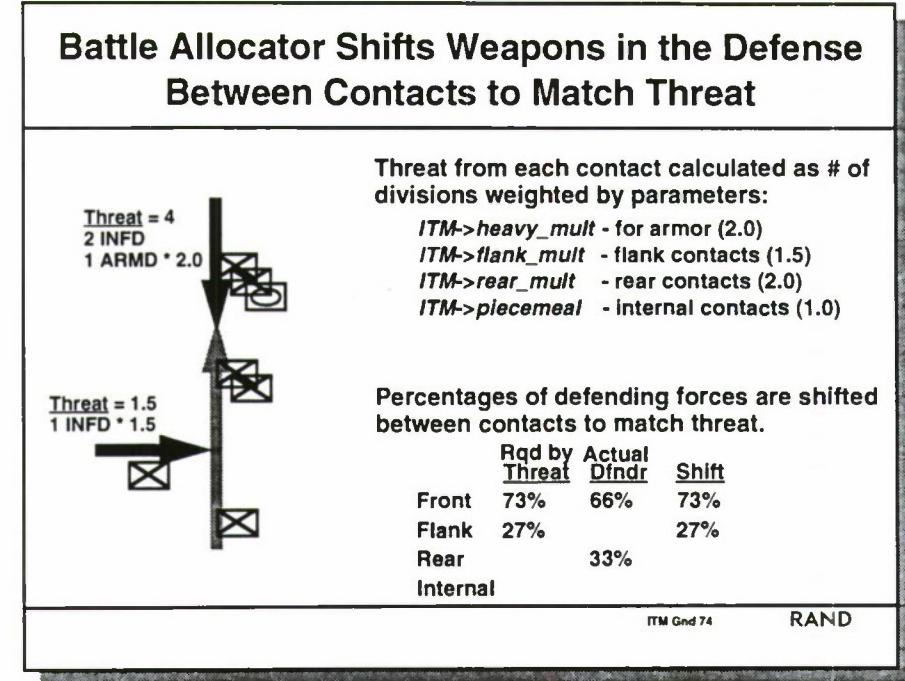
ITM Gnd 73

RAND

The LoC (Line of Communication) Commander is an ITM module that manages the rotation of reserve, frontal, and reconstituting forces.

Units are committed from the reserves to go to the frontal battle if the terrain width and the command's mission limit on divisions allow, or to replace a unit pulled from the front. Units are pulled from the front into the reserves or reconstitution as they fall below set cohesion levels, and are returned from reconstitution to the reserves when they recover to a specified level.

A unit defending by itself, or any defending units in a breakthrough, cannot be pulled from the front into reserves or be reconstituted. When a unit drops below the final cohesion level specified in LANDWAR->*force_break*, it is considered broken and is immobilized, and overrun if the MOFL moves over it.



Since units in ITM are typically represented as divisions, it is often not appropriate to position entire units to cover flanks or clean up overrun units. Therefore, another ITM module called the Battle Allocator is allowed to shift fractions of the forces in the various contact positions to support other contacts, without moving the actual units.

The Battle Allocator rates the threat faced at each contact by multiplying the number of enemy divisions faced in each contact by a parameter weight for the type of force and contact. These values are normalized to find the percentage of the total threat faced at each contact, and fractions of the forces in each position are reallocated so that the distribution of ED strength matches the distribution of the threat.

Weapons are taken first from the internal position, then the rear, flank, and front. Weapons are never shifted to the front: The LoC Commander commits whole units to the front as required.

Units Affiliate with POMCUS and/or MPS Sets Using the Employ Order

order CFCK employ GuamMebSet	<u>MPS set</u>	<u>unit</u>	<u>ownr</u>	<u>MPS dest</u>	<u>unit dest</u>	<u>use</u>
	1-MPS	US	Pusan	Pusan	-	
order CFCK employ 3ACR1RegtSet	<u>POMCUS set</u>	<u>unit</u>	<u>ownr</u>	<u>use</u>		
	3-ACR	US	-			
	MPS/POMCUS set	set name from <i>materiel.sec</i>				
	unit, ownr	unit and owner name to affiliate with set				
	MPS/unit dest	destination of MPS ship and ground unit				
	use	optional use file executed when affiliation complete				

- Sets defined in file *materiel.sec*
- MPS ship and unit destinations need not be final debarkation port
 - but must be deployed to the same port eventually
- Ground unit automatically deploys to POMCUS location

ITM Gnd 75

RAND

POMCUS and MPS sets are named sets of unit equipment, prepositioned around the world. Ground units can be ordered to marry up with these sets, using the Employ order. POMCUS (Prepositioned Unit Sets) are located at places; MPS (Maritime Prepositioned Shipping) ships are in special naval task groups.

Given an order to employ a POMCUS set, the ground unit deploys automatically to the location of the set and incorporates the equipment after a delay specified in the set description (file *materiel.sec*). When a ground unit employs an MPS set, individual destinations for the MPS task group and the ground unit are specified. These destinations may not be the same if, for instance, each force is deployed to an intermediate staging area, but both forces must eventually be deployed to the same port to marry up. The delay required for the ground unit to incorporate the MPS equipment is set by the parameter MOBILITY->mps_delay.

War Reserve Materiel Replace Combat Losses

- **Stocks of unit equipment at network places**

- defined in *materiel.sec*
- standard 14 equipment categories
- at specific places, owned by specific owners

display resupply <region> <owner>

- **Parameters control replacement rate**

MATERIEL->*min_losses* - fraction of loss to unit before equipment is issued

MATERIEL->*replace_hrs* - hours after H-hour before first issue

MATERIEL->*max_replace* - fraction of original unit strength issuable per day

ITM Grd 76

RAND

War Reserve Materiel (WRM) are stocks of ground weapons located at network places and available to replace the combat losses of units. Each stock is owned by a particular government and is issued only to units of the same owner and in the same theater as the stock.

The resupply display shows WRM totals (as well as other supplies and munitions) in a region for a particular owner, and the Resupply orders can be used to move or create new WRM.

Replacement rates are controlled by parameters that are set for each theater command.

Combat Losses Are Repaired Locally or in the Rear

- Fraction repairable locally is immediately returned to unit

parameter MATERIEL->*local_repair*

hvy	lgt	lr	sr	sm	sp	td	gdd	oir	atk					
tank	ifv	apc	arv	arv	atom	atom	mrtr	arms	arty	arty	adef	adef	adef	helo
.2	.1	.1	.2	.1	.1	.1	.05	.05	.2	.1	.05	.05	.05	.01

- Fraction repairable in rear is added to WRM after a delay

parameter MATERIEL->*rear_repair*

hvy	lgt	lr	sr	sm	sp	td	gdd	oir	atk					
tank	ifv	apc	arv	arv	atom	atom	mrtr	arms	arty	arty	adef	adef	adef	helo
.4	.2	.2	.4	.2	.2	.2	.15	.15	.4	.2	.05	.05	.05	.1

parameter MATERIEL->*days_repair*

hvy	lgt	lr	sr	sm	sp	td	gdd	oir	atk					
tank	ifv	apc	arv	arv	atom	atom	mrtr	arms	arty	arty	adef	adef	adef	helo
10	5	5	10	5	5	5	5	5	10	5	10	10	10	5

ITM Gnd 77

RAND

Specified fractions of equipment lost in combat are repairable either locally at the unit or in the rear area after some delay. The fraction of losses judged repairable locally is returned to the unit immediately (in effect, reducing combat losses by that amount). The equipment that is only repairable in rear-area facilities is added to WRM stocks (described on the preceding slide) after a number of days' delay, specified individually for each equipment type. The fraction not repairable locally and not repairable in the rear (100% - MATERIEL->local_repair - MATERIEL->rear_repair) is the fraction never repairable (e.g., K-kills).

Ground Munition Supply Consumption Measured in ED-Days of Supply

- Ground Munition supply stocks are totalled by region
 - defined in *weapon2.sec*
 - measured in ED-days of supply of two types
 - edsupply_self* - usable only by the owner's forces
 - edsupply_other* - also usable by allied forces
- Transferred to forces at 0000Z each day
 - converted to days of supply according to unit ED score
- Parameters control resupply rate
 - MATERIEL->reorder_point, supply_objective** - days of supply below which a unit is resupplied, and amount it is resupplied to
 - MATERIEL->network_capacity, gndforce_capacity** - maximum days of supply a theater can deliver and a unit can receive in one day

ITM Gnd 78

RAND

Supply for ground units is measured in ED-days of supply, where *one ED-day of supply* is the supply required by a force of one ED for one day at the "normal" combat rate. The *normal rate* is currently defined as main attack, but can be changed in the data.

Stocks of ground supply are kept only by region—they are not located on the surface network. Stocks are kept separately in a region by the owning government and are of two types, usable only by the owner's forces (*edsupply_self*) and also usable by allied forces (*edsupply_other*). Forces draw first from their own supplies, then from interoperable supplies. The parameter *CMDGOV->intopr_mult* defines the loss in effectiveness for ground units using allied supplies. It is not implemented in JICM 1.0.

Resupply is accomplished by a simple model that operates once at the beginning of each day. Parameters specify the total amount of supply that can be delivered in the theater and that each unit can receive in a day. ED-days of supply are converted to days of supply for an individual unit when delivered, by dividing by the unit's ED strength. Delivery is instantaneous—there is no explicit transport of supplies across the network.

A unit begins to lose combat effectiveness when it falls below 2 days of supply on hand. This was described in the section on unit effectiveness, Section 2.

Logistics Tail Length Modifies Resupply Rate

- Logistics tail for each command moves at set speed (*tail_spd*), staying between set min (*tail_min*) and max (*tail_hold*) distance from MOFL
- Length beyond minimum reduces resupply rate in proportion to set length, where rate is 50% (*tail_half*).

Parameters

ITM->tail_spd - movement speed of the logistics tail of a command

ITM->tail_min - minimum length of logistics tail (measured to command's MOFL)

ITM->tail_hold - maximum length of log tail before command is ordered to stop

ITM->tail_atk - maximum allowed length of log tail to launch an attack

LANDWAR->tail_half - length of logistics tail at which the resupply rate is reduced 50%

ITM Gnd 79

RAND

Although corps-level logistics depots are not represented, each ground command has a notional logistics (log) tail that represents the dynamics of a command outrunning its supply—often an important limitation on rapid advances. Only the distance of the log tail from the command's front is kept and updated each period, according to the movement of the command's front and the rated speed of the tail (ITM->tail_spd).

The length of a command's log tail reduces the amount of supplies reaching the command's frontal units. When the tail is at its minimum length (ITM->tail_min), the supply flow is unrestricted. As the tail length grows, the delivery rate falls asymptotically to zero, where the length at 50% flow is set by LANDWAR->tail_half and is halved at each increment of LANDWAR->tail_half. There are also restrictions on the length of the tail for the command to advance or begin an attack.

Munition Consumption Rate Differs by Command Mission

- Parameter MATERIEL->*supply_rate*

Posture	%	Posture	%
Main-attack	100	Defend	120
Spt-attack	80	Delay	120
Pin-attack	50	Withdraw	40
Join-attack	50	Positional	120
Follow	5	Artillery unit	70
Rear echelon	5	No combat	1

- Measured in % of standard rate of 1 day of supply per day
- Multiplied by parameters MATERIEL->*supply_mult* in all cases, and MATERIEL->*intense_mult* in high-intensity battles

ITM Grid 80

RAND

The rate at which a unit consumes supplies varies with the mission of its assigned command, its position within that command, and, in some cases, the type of unit. The base consumption rates are defined in terms of the standard rate of one day of supply per day. Consumption is calculated each period.

Commands and Positional Units

Build Organic Defenses

- Build deliberate defenses when units have a defense-type mission and are not being pushed back
- Defense zone started at nose and built toward tail

Parameters (for theater side)

MATERIEL->*dlib_rate* - kms/day built

MATERIEL->*dlib_depth* - maximum km depth that can be built

ITM Grid 81

RAND

The ITM allows three levels of constructed defenses:

- Deliberate—built with a unit's organic resources
- Prepared—built with corps engineering resources
- Fortified—fortifications built before hostilities.

A defending command or positional unit always builds deliberate defenses for itself when it is not moving or being pushed back by combat. The defenses are represented as a zone on the link that starts at the command's or unit's front and is built back toward its tail, at a set rate (MATERIEL->*dlib_rate*) and to a maximum distance (MATERIEL->*dlib_depth*). As long as the defending command or unit has its front within this zone, the command or unit is credited with the defenses.

bld-barrier Script

Creates defensive barriers along links

```
def-level ____ orient ____ set/-  
set landwar KS-2 bld-barrier prepared -(5)axis.2(Kimpo) -  
  
def-level        deliberate, prepared, fortified  
orient           orientation [-](length)path(start)  
set or -        enter set if barrier is to be instantly created;  
                 "-" if barrier is to be built using theater resources
```

Parameters (for theater side)

MATERIEL->*prep_rate*, *fort_rate* - kms/day build rate of prepared or fortified defenses

MATERIEL->*prep_left*, *fort_left* - total sq kms that can be built in the theater (counting terrain width over the length of the barrier)

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Zones of defenses are ordered to be built independent of commands or positional units, through the MATERIEL->bld_barrier script. The defenses can be instantly created or ordered built at a kms/day rate set by parameters MATERIEL->prep_rate and fort_rate. Prepared and fortified defenses are also limited by available materials to a total number of square kms that can be built in the theater, set by parameters MATERIEL->prep_left and fort_left.

Minefield Script

Creates minefields along links

```
set itm CFCK itm minefield seoul/9/kimpo vehicle 1.0
```

terrain-segment position Identifying one segment of terrain created with the **LANDWAR->terrain** script

type	vehicle or Infantry
density	1.0 is standard

- Minefield covers the entire length of the identified terrain segment
- Kills a fraction of the frontal forces of a command traversing the segment
- Slows the command by $5\% \times (2 \times \text{vehicle-density} + \text{infantry-density}) / 3$.

Parameter

ITM->*mine_kills* - fraction of vehicles or infantry killed per km of 1.0-density minefield, specified for opposed or unopposed conditions

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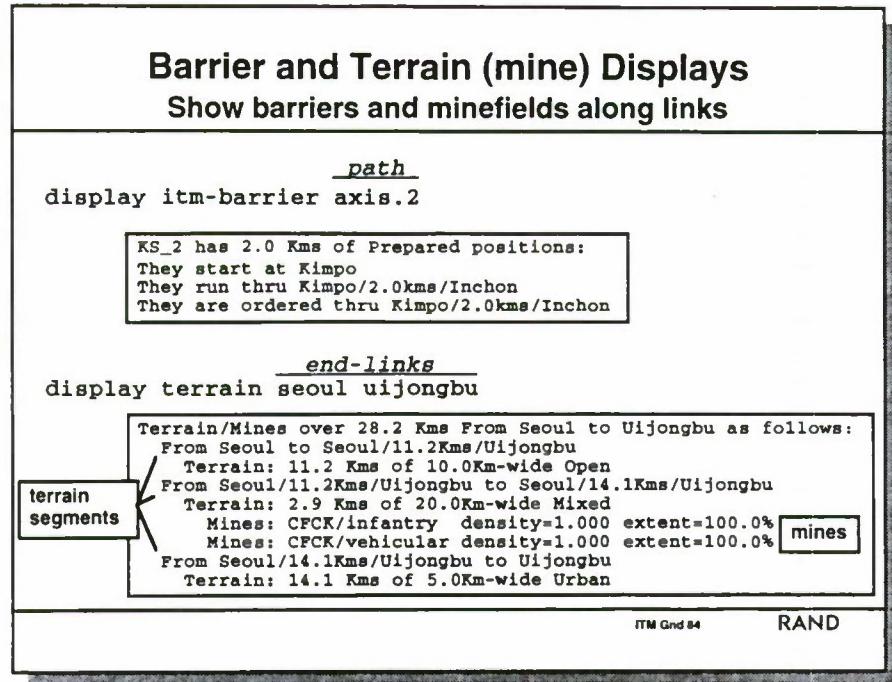
Minefields are not laid down in arbitrary zones but are, in JICM 1.0, tied to the terrain defined on the link, using the script LANDWAR->terrain:

```
set landwar - terrain Seoul Kimpo Urban 25 25% \
               Mixed 15 25% \
               Open 40 50% end
```

Each of the three terrain entries in the above example describes a terrain segment on the link covering a percentage of the distance between Seoul and Kimpo. A minefield is laid by specifying a position on the link with the script ITM->minefield. The new minefield then covers the entire terrain segment that covers that position. To create a smaller minefield, the terrain on the link would have to be redefined to create a smaller terrain segment.

The minefield is characterized by its type (vehicle or infantry) and density as compared with a standard (1.0). The minefield kills a specified fraction/km of the frontal forces of a command traversing the segment. The loss rate is defined for the standard density (ITM->*mine_kills*) and is multiplied by the minefield's relative density.

The command advancing into a minefield is also slowed by a nominal 5%, which is adjusted by the weighted average of the minefield's vehicle and infantry relative densities.



The itm-barrier display shows all barriers along a path through the network built with the LANDWAR->build_barrier script. It does not show the deliberate defenses constructed by defending commands and positional units. Also, barriers are destroyed as they are overrun and do not show on this display.

Minefields are shown on the terrain display, which lists the terrain segments along a link between two places. The minefield is also considered cleared as enemy forces move over it, so the "extent" field in the display shows the percentage of the remaining length of the terrain segment still covered.

Appendix

A. Parameters for: Ground<>movement

CONTENTS (14 parameters):

FORCE->gnd_embark	FORCE->gnd_move
FORCE->gnd_spacing	FORCE->stop_move
ITM->place_control	ITM->place_value
LANDWAR->move_eff	LOC->delay
LOC->max_speed	LOC->min_speed
LOC->sorts_day	REGION->loc_mult
REGION->refugees	UNIT->delay

FORCE->gnd_embark

Description: This option allows the analyst to shunt a ground force aboard any naval group that has at least one amphibious ship assigned. The analyst should use set force ves_move to position the ships BEFORE using this script.

Reasons a force cannot accept this script are:

- force is destroyed
- force is currently involved in a Deploy or Embark order activity
- force is currently executing an earlier gnd_move script
- group has no amphibious ships assigned
- group already has a ground force aboard

GROUP: Flagship name may also be used SPOE, which is where embarkation is assumed to have occurred. It does

NOT cause location of the ships to be there.

PLAN: Abel Plan to implement immediately, or - if none.

Example(s):

Keyword	Unit	Owner	GROUP	SPOE	PLAN
set force gnd_embark	6-MARB	SKorea	TG.19.1a	Pusan	Amp-Plan-7

FORCE->gnd_move

Description: This option allows the analyst to shunt a permitted ground force to a new position, which must be specified as either a place (example 1) or a between-place position (example 2).

If the arrival day specified has a fractional part, that part sets the time of day of arrival (e.g., 12.5 yields an arrival at noon on day 12).

Reasons a force cannot accept this script are:

force is destroyed

force is currently involved in a Deploy or Embark order activity

force is currently executing an earlier gnd_move script

Example(s):

Keyword	Unit	Owner Position	Day
set force gnd_move	6-MARB	SKorea Kimpo	12.5
set force gnd_move	6-MARB	SKorea Kimpo/10KMs/Inchon	10.2

FORCE->gnd_spacing

Description: Minimum time (in hours) between airlift departure of brigades of the same division when they are air deploying out of the same origin place.

See also FORCE->air_spacing.

Default: 24 hours

Maximum: 240

Minimum: 0

Example(s):

Keyword	New Value
set force gnd_spacing	12

FORCE->stop_move

Description: This option allows the analyst to cancel any currently ordered deployment of a ground force or air force. It will also cancel a currently scripted move (the force will simply "beam down" immediately).

Use this before FORCE->gnd_move or FORCE->air_move if necessary.

Warning: This script does not cause simulation of a change in orders. It simply ends the simulation of movement. If the force is currently scheduled or using strategic sealift, it will be placed at the homeport of the sealift, which is the last port-of-call where the ship unloaded cargo. For example, if pieces of a division are spread over 10 FSS all along the sea-lanes from SPOE to

SPOD, the division and all the ships will just be put back at the SPOE. Also, any airlift associated with the stopped move is released immediately and will become ready as soon as the game is advanced.

Use the `find` display after using this script to see where the force was placed. Then use `FORCE->gnd_move` or `FORCE->air_move` to position it.

Example(s):

Keyword	Unit	Owner
set force	stop_move	6-MARB SKorea
set force	stop_move	356-TFS SKorea

ITM->place_control

Description: This parameter manually resets the current control of a named place to the owner of the location of the named theater side. In the example, control of Pyongyang would be set to SKorea (which owns CFCK), regardless of whose forces are in or around Pyongyang.

This option affects routing decisions but little (if anything) else.

Default: as in data file place.unc.

Example(s):

Theater	Keyword	Place
set itm	CFCK	place_control pyongyang

ITM->place_value

Description: The value of a place when determining where reconstituting forces are to be positioned after their command has moved forward. Higher value is higher priority.

Default: 1 all places

Maximum: 30000

Minimum: 1

Example(s):

Theater	Keyword	Place	Priority
set itm	CFCK	place_value	Seoul 10000

LANDWAR->move_eff

Description: Percentage of a ground force's type movement speed to be used when force is moving tactically within its command area.

Default: 50

Maximum: 100

Minimum: 10

Example(s):

	Command	Keyword	Per cent
	set landwar	KN-7	move_eff
			60%

LOC->delay

Description: Allows user to simulate LoC damage by closing a link for a specified number of hours. This LoC damage affects administratively deploying ground forces, NOT tactically moving units.

Hours closed are from the time the script is issued. This information is a set, not an addition. Thus, if you specified 0, you could override any earlier scripted delay that had not yet expired. Dynamically adjudicated delays (resulting from air attacks targeted THTR_loc against a link) are entered in addition to this scripted delay, although each use of the script overrides any previously adjudicated delay.

Forces DO NOT reroute as a result of this script, and any forces already planning to use this link WILL BE delayed for the duration.

Maximum: 240 (10 days)

Minimum: 0

Example(s):

	Keyword	Link	Hours
	set LoC delay	Seoul/Uijongbu	12

LOC->max_speed

Description: The maximum allowable movement speed on this link, in KPD. This speed applies when the value of REGION->refugees is 0%. But as REGION->refugees ranges to 100%, allowable movement speed varies linearly between LOC->max_speed and LOC->min_speed.

So long as LOC->min_speed >= LOC->max_speed (as it is in default data for all links), then REGION->refugees has no effect on the link. To make the refugee congestion model work, reset the values of BOTH LOC->max_speed and LOC->min_speed (and, of course, REGION->refugees).

This parameter affects tactical and deployment movements on the link.

Default: 10000 (congestion model is off)

Maximum: 10000 KPD (model off)

Minimum: 1 KPD

Example(s):

Keyword	Link	KPD
set LoC max_speed Seoul/Uijongbu	200	

LOC->min_speed

Description: The minimum allowable movement speed on this link, in KPD. This speed applies when the value of REGION->refugees is 100%. But as REGION->refugees ranges to 100%, allowable movement speed varies linearly between LOC->max_speed and LOC->min_speed.

So long as LOC->min_speed \geq LOC->max_speed (as it is in default data for all links), then REGION->refugees has no effect on the link. To make the refugee congestion model work, reset the values of BOTH LOC->max_speed and LOC->min_speed (and, of course, REGION->refugees).

This parameter affects tactical and deployment movements on the link.

Default: 10000 (congestion model is off)

Maximum: 10000 KPD (model off)

Minimum: 1 KPD

Example(s):

Keyword	Link	KPD
set LoC min_speed Seoul/Uijongbu	10	

LOC->sorts_day

Description: Allows user to specify how much LoC damage is caused by air attack. The damage metric is number of equivalent sorties to cause 24-hour closure of the link. Adjudicated LoC damage causes delay affecting administratively deploying ground forces, NOT tactically moving units.

Forces DO NOT reroute because of adjudicated delays, so any forces already planning to use a link WILL BE delayed.

See also LOC->delay.

Default: 0

Maximum: 250

Minimum: 0 (meaning LoC cannot be closed)

Example(s):

Keyword	Link	Eq Sorts / Day
set LoC sorts_day	Seoul/Uijongbu	20

REGION->loc_mult

Description: Multiplier of overland movement rates assumed to use the indigenous ITM network. It applies to independent force deployments, not to command tactical movements.

Default: 1.0 All Regions.

Maximum: 1.0

Minimum: .2

Example(s):

Region	Keyword	Value
set region us-se	loc_mult	.8

REGION->refugees

Description: Current extent of the refugee problem in this region as it affects LoC congestion. If 0%, then no problem exists; if 100%, means problem is the worst possible.

See documentation for LOC->max_speed and LOC->min_speed for effect of REGION->refugees.

Example(s):

Region	Keyword	Value
set region skorea	refugees	20%

UNIT->delay

Description: This option allows the user to cause a delay to a named ground force. It will have some effect only IF the force is moving. The example would cause the 3rd-Bde of the 2nd-Armored 8 hours' delay.

Example(s):

Keyword	Unit Name	Owner	Hours delay
set unit delay	2-Arm/3-Bde	US	8

B. Parameters for: Ground<>amphib

CONTENTS (9 parameters):

BEACH->create	BEACH->length
BEACH->position	BEACH->quality
BEACH->width	FORCE->amph_load
FORCE->gnd_embark	FORCE->lcac_turn
VESSEL->plan	

BEACH->create

Description: Allows creation of the beach associated with a place that does not already have one. (In naming the place, the -beach suffix is optional.) All items in the beach data are set to default values. In particular, the beach is initially assumed to be located exactly at the named place, but script BEACH->position will override this location.

Example(s):

Name	Option
set beach Kimpo	create

BEACH->length

Description: Length that must be traversed by landing craft, in km.

Default: 5

Maximum: 100

Minimum: .1

Example(s):

Name	Option	New Value
set beach Kimpo-beach	length	.2

BEACH->position

Description: Specifies the ITM land position at which the midpoint of a beach is located.

Default: exactly at the place for which the beach is named

Example(s):

Name	Option	Position
set beach Kimpo-beach	position	kimpo/5/kaesong

BEACH->quality

Description: A characterization of the suitability of the beach from the point of view of a force assaulting it. It is either good or poor.

Default: good

Example(s):

Name	Option	New Value
set beach Kimpo-beach	quality	poor

BEACH->width

Description: Width or frontage of the beach, in km. It is the length of ITM land link along which landings at this beach are assumed to occur. This stretch of link is centered on the position specified by script BEACH->position.

Default: 20

Maximum: 100

Minimum: 1

Example(s):

Name	Option	New Value
set beach Kimpo-beach	width	10

FORCE->amph_load

Description: The multiplier for converting the number of troops in a ground unit (given in the PAX column of the Ground Force Type data) into the number of equipped troops against which the carrying capacity of amphib ships is measured (given in the Troops column of the Vessel Type data, Section 4). Thus, if a ground unit is listed as having 15,000 troops, all available amphib ships have a capacity of 1500 troops, and *amph_load* is set to 2.0, then a total of 15,000 times 2.0 divided by 1500, or 20 amphib ships, would be needed to transport the unit.

Default: 2.5

Maximum: 100.0

Minimum: 1.0

Example(s):

Keyword	Mult
set force amph_load	2.0

FORCE->gnd_embark

Description: This option allows the analyst to shunt a ground force aboard any naval group that has at least one amphibious ship assigned. The analyst should use set force ves_move to position the ships BEFORE using this script.

Reasons a force cannot accept this script are:

- force is destroyed
- force is currently involved in a Deploy or Embark order activity
- force is currently executing an earlier gnd_move script
- group has no amphibious ships assigned
- group already has a ground force aboard

GROUP: Flagship name may also be used SPOE, which is where embarkation is assumed to have occurred. It does

NOT cause location of the ships to be there.

PLAN: Abel Plan to implement immediately, or – if none.

Example(s):

Keyword	Unit	Owner	GROUP	SPOE	PLAN
set force gnd_embark	6-MARB	SKorea	TG.19.1a	Pusan	Amp-Plan-7

FORCE->lcac_turn

Description: The time in hours required for LCAC turnaround—i.e., either to unload troops and equipment onto the beach or to reload at the ships for another trip. (If these times are different, this parameter should be set to the average of the two.) Note that a landing of n cycles would require $(2n-1) * lcac_turn$ (plus the travel time) to complete, because the landing begins with the first load in place.

Default: .2

Maximum: 10.0

Minimum: .01

Example(s):

Keyword	Hours
set force lcac_turn	.25

VESSEL->plan

Description: Sets the Abel contingency plan to be executed at the end of the current phase of amphibious movement. Execution is allowed only if the designated task group has an embarked or embarking ground force.

Example(s):

Group/Flagship	Keyword	Plan Name
set vessel	ATF.26_1	plan
		KuwaitAssault1

C. Parameters for: Ground<>missile_unit_data

CONTENTS (9 parameters):

CREATE->mslforce	FORCE->msl_move
MISSILE->latlon	MISSILE->reload
MSTYPE->alert_rate	MSTYPE->disp_rate
MSTYPE->max_alert	MSTYPE->min_flight
MSTYPE->range	

CREATE->mslforce

Description: Allows the analyst to create new missile forces that were not in the original database.

Unit name: You must select a unique interface name for the force that meets the missile.sec naming convention. In a nutshell, missile force names must be alpha-numeric characters only—NO punctuation is allowed except the period (.).

Owner: Any government name.

Type: The name of any missile type (from missile.sec).

Size: Enter number of launchers for this force (<= 250).

Ammo: Enter conventional, chemical, or nuclear. Selection must be consistent with weapons types available for the type missile.

Location: Enter the land region, place, or between-place position where the force is to be located.

Note: Use the Assign order to specify a command for the force.

The example below creates a new SKorean force 32-ARMDIV, with TOE exactly 90% of the weapons of the US 1-ARMD, and places it on the network between Seoul and Kimpo, 10 kilometers from Seoul.

Example(s):

Keyword	Unit-Name	Owner	Type	Size	Ammo	Location
set create mslforce	USPATSKOR	US	PATRIOT	10	conv	Seoul/15Kms/Kimpo

FORCE->msl_move

Description: Allows the analyst to script the movement of any missile force to any land position in the world. The new position may be specified as either:

the name of a land region (meaning AT the region's default place)

the name of any land region place (e.g., Moscow)

any between-place position (e.g., Seoul/8.2Kms/Kimpo)

The script requires specification of an arrival time. If this time is in the game past, the move occurs instantaneously. If not, the force is totally unavailable for action from the time the script is issued until arrival time occurs, and may not appear in various displays while it is in limbo (awaiting arrival time)

DANGER: If the script is used on a missile force that is targeted according to the strategic execution models, and the effect of the script is to change the region location of the force, it is unclear what effect that change may have on strategic weapons accounting and strategic displays, or whether it is otherwise safe to order a strategic execution affecting that force.

If the arrival day specified has a fractional part, that part sets the time of day of arrival (e.g., 12.5 yields an arrival at noon on day 12).

Example(s):

Keyword	Force	New Position	Day
set force	msl_move KNSCUD1	Kaesong/1.5Km/Munsan	0.0
set force	msl_move IsraPatr	TelAviv	12.5

MISSILE->latlon

Description: Sets the specific latitude and longitude of a missile unit. Using it is not recommended, now that specific Deploy orders can be issued to missile forces.

Default: Centroid of current region.

Example(s):

Unit	Keyword	Latitude	Longitude
set missile	IsraPatr	latlon	45
			5

MISSILE->reload

Description: Adds to the number of missiles available with a given type of warhead (conventional, nuclear, or chemical). This script creates the missiles and their warheads from nothing.

Example(s):

Unit	Keyword	Type	Additional
set missile	USNplMX	reload	nuclear
			15

MSTYPE->alert_rate

Description: The rate at which a desired alert level can be achieved, expressed as the fraction of the force that can achieve the alert status per hour: e.g., a rate of .5 means that a force can become fully alerted in 2 hours.

Default: Set in the database for all missile types.

Maximum: 1.

Minimum: 0.

Example(s):

Type	Keyword	New Value
set mstype	S_3	alert_rate
		.02

MSTYPE->disp_rate

Description: The rate at which a dispersal operation for this type missile can be achieved, in fraction of the force per hour.

Default: Set in the database for all missile types.

Maximum: 1.

Minimum: 0.

Example(s):

Type	Keyword	New Value
set mstype	SCUD	disp_rate
		.5

MSTYPE->max_alert

Description: The maximum alert level that can be ordered for this missile type.

Default: Set in the database for all missile types.

Maximum: 1.

Minimum: 0.

Example(s):

Type	Keyword	New Value
set mstype	SCUD	max_alert
		.90

MSTYPE->min_flight

Description: The minimum flight time for missiles, in minutes. Three categories are recorded: ICBMs, SLBMs, and other. Does not apply to VSRBMs, NUCARTY, or cruise missiles of all types.

Default: Set in the database for all three categories.

Example(s):

Type	Keyword	New Value
set mstype	SS18_FA	min_flight 15

MSTYPE->range

Description: The maximum range of this missile type, in kms.

Default: Set in the database for all missile types.

Maximum: 100000.0

Minimum: .1

Example(s):

Type	Keyword	New Value
set mstype	SCUD	range 1000.

D. Parameters for: Ground<>airlift

CONTENTS (3 parameters):

COMMAND->intra_cgo COMMAND->intra_pax
FORCE->gnd_spacing

COMMAND->intra_cgo

Description: Sets the percentage of LIFT command-assigned cargo aircraft to be used for intra-theater requirements (and thus not available for strategic airlift requirements).

Default: 10 for all lift commands

Maximum: 95

Minimum: 0

Example(s):

Keyword	Name	Percent
set command intra_cgo	CFCK	25

COMMAND->intra_pax

Description: Sets the percentage of LIFT command-assigned troop aircraft to be used for intra-theater requirements (and thus not available for strategic airlift requirements).

Default: 10 for all lift commands

Maximum: 95

Minimum: 0

Example(s):

Keyword	Name	Percent
set command intra_pax	CFCK	25

FORCE->gnd_spacing

Description: Minimum time (in hours) between airlift departure of brigades of the same division when they are air deploying out of the same origin place.

See also **FORCE->air_spacing**.

Default: 24 hours

Maximum: 240

Minimum: 0

Example(s):

Keyword	New Value
set force gnd_spacing	12

E. Parameters for: Ground<>preparation

CONTENTS (10 parameters):

FORCE->no_tng	GOVT->tng_rate
GROUND->mobilize	GROUND->train
LANDWAR->tng_min	REGION->mob_mult
UNIT->alert	UNIT->mobilize
UNIT->ready_hours	UNIT->train

FORCE->no_tng

Description: Select this option if you DO NOT want the current training level of a ground force to be considered in its cohesion calculation.

Example(s):

Keyword
set force no_tng

GOVT->tng_rate

Description: The rate at which a government's ground forces can increase their training readiness, in fractional increase per hour. This metric is very inconvenient and will eventually be changed to percent per day (%/day). In the meantime, consider (as a guide) that a rate of .00042 training readiness increase per hour (the current) is equal to ~ 1%/day.

Default: .001 (2.4%/day) all Govts.

Maximum: .1000 (240%/day)

Minimum: .0001 (.24%/day)

Example(s):

Gov't	Keyword	Value
set govt czech	tng_rate	.0015

GROUND->mobilize

Description: Event type mobilize will cause the current mobilization level of all specified forces to be raised to the fraction scripted, but it will not lower the mobilization level of forces already at higher levels.

The user may use "all" in the Owner field, but must specify a location that is either a land region or an overlay region.

Maximum: 1.0

Minimum: 0.0

Example(s):

Keyword	Owner	Location	Fraction
set ground	mobilize	us	.72

GROUND->train

Description: Event type train will cause the current training level of all specified forces to be raised to the fraction scripted, but it will not lower the training level of forces already at higher levels.

The user may use "all" in the Owner field, but must specify a location that is either a land region or an overlay region.

Maximum: 1.0

Minimum: 0.0

Example(s):

Keyword	Owner	Location	Fraction
set ground	train	us	.80

LANDWAR->tng_min

Description: Percentage training level a force must attain before it can begin to deploy.

Default: 100

Maximum: 100

Minimum: 30

Example(s):

Command	Keyword	Percent
set landwar	CFCK	tng_min 80

REGION->mob_mult

Description: Analyst multiplier applied to mobilization after all other calculations are done. It permits the analyst to postulate increases or decreases in mobilization speed for forces in a particular region.

Default: 1.0 All Regions.

Maximum: 10.0

Minimum: 0.10

Example(s):

Region	Keyword	value
set region belarus	mob_mult	1.2

UNIT->alert

Description: This option allows the user to change the level of alert (disperse) of a specified ground force.

Maximum: 1.0

Minimum: 0.0

Example(s):

Keyword	Unit	Owner	Fraction	
set unit	alert	5-Abn/2-bde	us	1.0

UNIT->mobilize

Description: This option allows the user to change the level of mobilization of a specified ground or air force. The ordered level of mobilization is also set to the scripted value.

If, as a result of this script, both UNIT->mobilize and UNIT->train get set to 1.0, a ground unit's alert (disperse) level is also set to 1.0.

The user may use - or all in the Owner field.

Maximum: 1.0

Minimum: 0.0

Example(s):

Keyword	Unit	Owner	Fraction
set unit mobilize	24-MXD	us	1.0
set unit mobilize	35-TFW	us	1.0

UNIT->ready_hours

Description: This option allows the user to have a ground force use its personalized alert rate (dispersal rate) instead of its GTYPE d-rate. Simply state a NON-ZERO number of hours to achieve full alert. Using ZERO means you must use the GTYPE rate (the default for all ground forces).

Default: 0 (N.A.)

Maximum: 250

Minimum: 0

Example(s):

Keyword	Unit Name	Owner	Hours
set unit ready-hours	2-Armd/3-Bde	US	12

UNIT->train

Description: This option allows the user to change the level of training of a specified ground force.

If, as a result of this script, both UNIT->mobilize and UNIT->train get set to 1.0, a ground unit's alert (disperse) level is also set to 1.0.

The user may use - or all in the Owner field.

Maximum: 1.0

Minimum: 0.0

Example(s):

Keyword	Unit	Owner	Fraction	
set unit	train	5-Abn/2-bde	us	1.0

F. Parameters for: Ground<>supply

CONTENTS (13 parameters):

FORCE->cargo_factor	FORCE->cgo_stuff_of
FORCE->cgo_stuff_on	FORCE->force_factor
FORCE->helo_wt	GROUND->supply
SUPPLY->atk_helo	SUPPLY->gnd_intop
SUPPLY->gnd_owner	SUPPLY->pol_gnd
SUPPLY->pol_spec	SUPPLY->weapon_type
UNIT->to_wrm	

FORCE->cargo_factor

Description: When the cargo stuffing model is on [KSTon], the number of ED Days of Supply that can be accommodated in 1 KSTon of slack capacity aboard bulk cargo movement ships.

See also FORCE->cgo_stuff_on, FORCE->force_factor

Default: 1.0 (nominal)

Maximum: 10.0

Minimum: .01

Example(s):

Keyword	Value
set force cargo_factor	.7

FORCE->cgo_stuff_of

Description: This option turns off the cargo stuffing model.

See also FORCE->cgo_stuff_on, FORCE->force_factor, FORCE->cargo_factor

Default: OFF

Example(s):

Keyword
set force cgo_stuff_of

FORCE->cgo_stuff_on

Description: This option causes all convoys that sail with empty space to be filled up [“stuffed”] with ground force munitions (ED Days of Supply). If any ED DoS supplies explicitly exist in the POD region, the inventory is reduced accordingly, or else the supplies simply are assumed into existence.

See also FORCE->cgo_stuff_of, FORCE->force_factor, FORCE->cargo_factor. Programmers use DBX to see F->parm[217] for cumulative ED DoS created.

Default: OFF

Example(s):

Keyword

```
set force cgo_stuff_on
```

FORCE->force_factor

Description: When the cargo stuffing model is ON, the number of ED Days of Supply that can be accommodated in 1 KSTon of slack capacity aboard unit (force) movement ships.

See also FORCE->cgo_stuff_on, FORCE->cargo-factor

Default: .50 (nominal)

Maximum: 10.0

Minimum: .01

Example(s):

Keyword Value

```
set force force_factor .7
```

FORCE->helo_wt

Description: Shipping weight of the munitions for 1 attack helo sortie, in tons.

See also FORCE->bomb_wt.

Default: .5 Tons

Maximum: 2.0

Minimum: .1

Example(s):

Keyword New Value

```
set force helo_wt        1.0
```

GROUND->supply

Description: Allows the analyst to cause instantaneous delivery of ammunition to the specified forces. The user may use "all" in the Owner field, but must specify either a particular command or - (in which case only unassigned ground forces will be affected). All ground forces identified and belonging to the stated owner receive an increase in on-hand ammunition equal to that for the number of days specified. In the example, each identified force would receive enough ammunition for 6.5 days.

Maximum: 9999

Minimum: 0.0

Example(s):

	Keyword	Owner	Command	Days
set ground	supply	uk	ceur	6.5

SUPPLY->atk_helo

Description: Stock of munitions for the owner's attack helicopters, expressed in number of sorties. The analyst can script the delivery or destruction of these munitions. Such orders must specify the land region and the owner of the munitions.

If the quantity specified is greater than 1, the order is interpreted as delivery of that many sorties of supply.

If the quantity specified is less than or equal to 1, the order is interpreted as a kill, and that fraction of the owner's stocks is destroyed.

See resupply displays for current quantities of munitions by owner.

Default: As defined in file weapon2.sec

Maximum: Values >= 99999 played as infinity.

Minimum: 0.0

Example(s):

	Region	Owner	Keyword	Frac-to-kill
set supply	Belg	Belg	atk_helo	.6

	Region	Owner	Keyword	Qty-to-add
set supply	Belg	UK	atk_helo	2000

SUPPLY->gnd_intop

Description: Stocks of ground munitions interoperable with those of the allies, expressed in ED days of supply. The analyst can script the delivery or destruction of these munitions. Such orders must specify the land region and the owner of the munitions.

If the quantity specified is greater than 1, the order is interpreted as delivery of that many ED days of supply.

If the quantity specified is less than or equal to 1, the order is interpreted as a kill, and that fraction of the owner's stocks is destroyed.

See resupply displays for current quantities of munitions by owner.

Default: As defined in file weapon2.sec

Maximum: Values >= 99999 played as infinity.

Minimum: 0.0

Example(s):

	Region	Owner	Keyword	Frac-to-kill
set supply	FRG-W	US	gnd_intop	.6

	Region	Owner	Keyword	Qty-to-add
set supply	FRG-E	UK	gnd_intop	25

SUPPLY->gnd_owner

Description: Stocks of ground munitions that are usable only by their owner, expressed in ED attack days of supply. The analyst can script the delivery or destruction of these munitions. Such orders must specify the land region and the owner of the munitions.

If the quantity specified is greater than 1, the order is interpreted as delivery of that many ED days of supply.

If the quantity specified is less than or equal to 1, the order is interpreted as a kill, and that fraction of the owner's stocks is destroyed.

See resupply displays for current quantities of munitions by owner.

Default: As defined in file weapon2.sec

Maximum: Values >= 99999 played as infinity.

Minimum: 0.0

Example(s):

	Region	Owner	Keyword	Frac-to-kill
set supply	FRG-W	US	gnd_owner	.6

	Region	Owner	Keyword	Qty-to-add
set supply	FRG-E	UK	gnd_owner	25

SUPPLY->pol_gnd

Description: Stock of vehicle fuel for a particular owner in a land region.

If the quantity specified is greater than 1, the order is interpreted as delivery of that many Mega-Barrels of POL.

If the quantity specified is less than or equal to 1, the order is interpreted as a kill, and that fraction of the owner's stocks is destroyed.

See resupply displays for current quantities of POL by owner.

Default: As defined in file weapon2.sec

Maximum: Values >= 99999 played as infinity.

Minimum: 0.0

Example(s):

	Location	Owner	Keyword	Frac-to-kill
set supply	Belg	Belg	pol_gnd	.6

	Location	Owner	Keyword	Qty-to-add
set supply	UK	UK	pol_gnd	3.5

SUPPLY->pol_spec

Description: Stock of special fuel for a particular owner in a land region. Note: The meaning of *special fuel* is not yet defined.

If the quantity specified is greater than 1, the order is interpreted as delivery of that many Mega-Barrels of POL.

If the quantity specified is less than or equal to 1, the order is interpreted as a kill, and that fraction of the owner's stocks is destroyed.

See resupply displays for current quantities of POL by owner.

Default: As defined in file weapon2.sec

Maximum: Values >= 99999 played as infinity.

Minimum: 0.0

Example(s):

	Location	Owner	Keyword	Frac-to-kill
set supply	Belg	Belg	pol_spec	.6

	Location	Owner	Keyword	Qty-to-add
set supply	FRG-W	US	pol_spec	3.5

SUPPLY->weapon_type

Description: Stocks of explicitly defined munitions (e.g., MAVERICK). The analyst can script their delivery or destruction. Such scripts must specify the owner of the weapons and the region where the munitions are located. High-tech air-to-air and ground-to-air munitions are accessible with this option. Caution: If bomber and/or missile weapons inventories are specified, the missile and bomber posting records are NOT adjusted. This affects only some of the strategic force's displays.

If the quantity specified is greater than 1, the order is interpreted as delivery of that many weapons to the inventories of this weapon type.

If the quantity specified is less than or equal to 1, the order is interpreted as a kill, and that fraction of the owner's stocks is destroyed.

See resupply displays for current quantities of munitions by owner.

Default: As defined in file weapon2.sec

Maximum: Values >= 99999 played as infinity.

Minimum: 0.0

Example(s):

	Location	Owner	Keyword	Munition	Frac-to-kill
set supply	FRG-W	US	weapon_type	DURANDAL	.6

	Location	OWNER	Keyword	Munition	Qty-to-add
set supply	Poland	USSR	weapon_type	SCUD_chem	20

UNIT->to_wrm

Description: This option allows the user to have a ground force deleted as an explicit unit and all of its surviving equipment to be added to the WRM (war reserve materiel) account in the region where the force is located.

Example(s):

	Keyword	Unit Name	Owner
set unit	to_wrm	2-Armd/3-Bde	US

G. Parameters for: Ground<>mines

CONTENTS (2 parameters):

ITM->minefield

ITM->mine_kills

ITM->minefield

Description: Permits creation of minefields and changes to density of existing ones, including setting density to 0, which clears the minefield. Minefields are owned by the theater that creates them and are of Type vehicle or infantry.

Minefields can be located only on explicitly created terrain (i.e., terrain that was created using LANDWAR->terrain), and a minefield that is on such a terrain segment covers the segment's entire length and width. To create a minefield 5 Kms long but the terrain segment is 10 Kms long, use LANDWAR->terrain to re-create the terrain segments on that link to the sizes desired. This will, of course, eliminate any existing minefields on that link.

You must specify some position WITHIN the terrain segment where you wish the minefield. Use the terrain display to see terrain segment extents. For example, the terrain display for Seoul to Uijongbu shows:

13.8 Kms of 12.0Km-wide Urban terrain

FROM Seoul TO Seoul/13.8Kms/Uijongbu

14.4 Kms of 12.0Km-wide Mixed terrain

FROM Seoul/13.8Kms/Uijongbu TO Uijongbu

The position in the first example below identifies the first segment (since 9 Kms from Seoul is within the first segment's limits). If you happen to know the percentages you used when creating the segments, you can use intermediate values instead of kilometer points. In the second example, the 25% position clearly identifies the first segment.

You may NOT simply specify a place name (e.g., seoul), since that does not identify a link at all.

See documentation for ITM->mine_kills for minefield effects data.

Default: No land minefields anywhere.

Maximum: 10 density

Minimum: 0 density

Example(s):

Theater	Keyword	Position	Type	Density
set item CFCK		minefield seoul/9Km/ujjongbu	vehicle	1.0
set item CFCK		minefield seoul/25%/ujjongbu	vehicle	1.2

ITM->mine_kills

Description: Fraction of vehicles (or infantry) killed by a minefield of density 1.0 for each kilometer of length traversed. These kills are applied to an advancing enemy command's at-Flot forces as they traverse the length of terrain segment where the minefield is scripted.

A data set consists of kill rates for vehicular and infantry mines, and a separate data set is needed for two Statuses: opposed and unopposed.

Loss rates vary linearly as the density of a minefield varies from 1.0.

After a command has traversed a field, its density is set to 0.0.

See documentation for ITM->minefield for creation of minefields.

Default: .01/.005 for opposed/unopposed vehicle and infantry, for all Theaters

Maximum: .25

Minimum: .001

Example(s):

Theater	Keyword	Status	Veh	Inf
set item CFCK	mine_kills	opposed	.02	.01

H. Parameters for: Ground<>effects

CONTENTS (18 parameters):

CMDGOV-> adef_mult	CMDGOV-> air_gnd_mult
CMDGOV-> armor_mult	CMDGOV-> arty_mult
CMDGOV-> cntr_battery	CMDGOV-> cntr_manvr
CMDGOV-> comb_mult	CMDGOV-> deep_fires
CMDGOV-> gnd_mult	CMDGOV-> helo_mult
CMDGOV-> home_mult	CMDGOV-> infty_mult
CMDGOV-> intopr_mult	GROUND-> wpn_scores
LANDWAR-> chemical	LANDWAR-> surprise
REGION-> gnd_mult	UNIT-> effective

CMDGOV->adef_mult

Description: Air defense effectiveness multiplier for a Command (applicable to assigned ground units) or Government (applicable to ground units owned).

Default: 1.0

Maximum: 100.0

Minimum: .01

Example(s):

Cmd/Gov	Keyword	Value
set cmdgov	AFSOUTH	adef_mult
		1.5

CMDGOV->air_gnd_mult

Description: Joint air-ground operations effectiveness multiplier for a Command (applicable to assigned ground units) or Government (applicable to ground units owned).

Default: 1.0

Maximum: 100.0

Minimum: .01

Example(s):

Cmd/Gov	Keyword	Value
set cmdgov France	air_gnd_mult	.9

CMDGOV->armor_mult

Description: Armor effectiveness multiplier for a Command (applicable to assigned units) or Government (applicable to units owned). Note that it multiplies the single effectiveness score (EED) of a unit by an amount proportional to that unit's armor holdings.

Default: 1.0

Maximum: 100.0

Minimum: .01

Example(s):

Cmd/Gov	Keyword	Value
set cmdgov AFSOUTH	armor_mult	1.5

CMDGOV->arty_mult

Description: Artillery effectiveness multiplier for a Command (applicable to assigned units) or Government (applicable to units owned). Note that it multiplies the single effectiveness score (EED) of a unit by an amount proportional to that unit's artillery holdings.

Default: 1.0

Maximum: 100.0

Minimum: .01

Example(s):

Cmd/Gov	Keyword	Value
set cmdgov AFSOUTH	arty_mult	1.5

CMDGOV->cntr_battr

Description: Counter-battery fire effectiveness multiplier for a Command (applicable to assigned ground units) or Government (applicable to ground units owned).

Default: 1.0

Maximum: 100.0

Minimum: .01

Example(s):

Cmd/Gov	Keyword	Value
set cmdgov AFSOUTH	cntr_battr	1.5

CMDGOV->cntr_manvr

Description: Counter-manuever fire effectiveness multiplier for a Command (applicable to assigned ground units) or Government (applicable to ground units owned).

Default: 1.0

Maximum: 100.0

Minimum: .01

Example(s):

Cmd/Gov	Keyword	Value
set cmdgov AFSOUTH	cntr_manvr	1.5

CMDGOV->comb_mult

Description: Combined-operations effectiveness multiplier for a Command (applicable to assigned ground units) or Government (applicable to ground units owned).

Example(s):

Cmd/Gov	Keyword	Value
set cmdgov AFSOUTH	comb_mult	1.5

CMDGOV->deep_fires

Description: Deep fire effectiveness multiplier for a Command (applicable to assigned ground units) or Government (applicable to ground units owned). NOT USED

Default: 1.0

Maximum: 100.0

Minimum: .01

Example(s):

Cmd/Gov	Keyword	Value
set cmdgov AG-Italy	deep_fire	1.1

CMDGOV->gnd_mult

Description: Total ground combat effectiveness multiplier for a Command (applicable to assigned ground units) or Government (applicable to ground units owned).

Default: 1.0

Maximum: 100.0

Minimum: .01

Example(s):

Cmd/Gov	Keyword	Value
set cmdgov	AFSOUTH	gnd_mult
		1.5

CMDGOV->helo_mult

Description: Helicopter effectiveness multiplier for a Command (applicable to assigned ground units) or Government (applicable to ground units owned).

Example(s):

Cmd/Gov	Keyword	Value
set cmdgov	France	helo_mult
		.9

CMDGOV->home_mult

Description: Effectiveness multiplier applied when fighting on home territory. If given by Command, it applies to assigned ground units. If given by Government, it applies to ground units that government owns.

Default: 1.0

Maximum: 100.0

Minimum: .01

Example(s):

Cmd/Gov	Keyword	Value
set cmdgov	AFSOUTH	home_mult
		1.5

CMDGOV->infty_mult

Description: Infantry effectiveness multiplier for a Command (applicable to assigned units) or Government (applicable to units owned). Note that it multiplies the single effectiveness score (EED) of a unit by an amount proportional to that unit's infantry holdings.

Default: 1.0

Maximum: 100.0

Minimum: .01

Example(s):

Cmd/Gov	Keyword	Value	
set cmdgov	France	infty_mult	.9

CMDGOV->intopr_mult

Description: Interoperability multiplier for a Command (applicable to assigned units) or Government (applicable to units owned). NOT USED

Default: 1.0

Maximum: 100.0

Minimum: .01

Example(s):

Cmd/Gov	Keyword	Value	
set cmdgov	Netherl	intopr_mult	1.1

GROUND->wpn_scores

Description: This script allows a user to multiply all the scores of ground forces by owner and/or command, for a particular weapon type. Weapon types are:

tank ifv apc hvy_arv lgt_arv lr_atgm sr_atgm
sm_mortar sm_arms sp_artillery td_artillery gdad_ahead oir_ahead atk_helo

This script will NEVER cause scores to go to zero when the physical count of surviving weapons is positive.

The script affects operational units, POMCUS/MPS stocks, and WRM.

Note: This script is usable only for a time-zero WSDS.

Maximum: 2.0

Minimum: .2

Example(s):

Keyword	Weapon	Owner	Command	Multiplier	
set ground	wpn_scores	tank	US	CEur	.5

LANDWAR->chemical

Description: Allows the user to script effects of a chemical attack. User specifies an effectiveness multiplier that initially applies to the forces being attacked chemically, plus a time, in hours, during which the degradation lasts. The effectiveness multiplier rises linearly from its initial value, reaching 1.0 at the end of the chemical effect's duration.

Maximum: .999

Minimum: .001

Example(s):

Command	Keyword	Value	Hours
set landwar	KN-CM	chemical	.9
			12

LANDWAR->surprise

Description: Allows the user to script a surprise condition into existence. User specifies an effectiveness multiplier that initially applies to the forces being surprised, plus a time, in hours, during which the degradation lasts. The effectiveness multiplier rises linearly from its initial value, reaching 1.0 at the end of the surprise's duration.

Maximum: .999

Minimum: .001

Example(s):

Command	Keyword	Value	Hours
set landwar	DPRK	surprise	1.5
			24

REGION->gnd_mult

Description: Analyst multiplier applied to ground force EED calculations. It permits the analyst to script changes of effectiveness in ground forces not explicitly modeled. For example, the detailed effects of successful OMG operations might not explicitly consider the effects of reducing C3I that result from attacks on rear headquarters. In such case, the analyst might reduce the effectiveness of ground forces in an axis that has been penetrated by an OMG by setting this parameter to a value less than 1.

Default: 1.0 All Regions.

Maximum: 2.0

Minimum: 0.1

Example(s):

Region	Keyword	Value	
set region	frge	gnd_mult	.8

UNIT->effective

Description: Sets the effectiveness multiplier for the unit.

Maximum: 1000

Minimum: 0

Example(s):

Keyword	Name	Owner	Multiplier
set unit effective	2-Armd/3-Bde	US	1.5

I. Parameters for: Ground<>unit_data

CONTENTS (18 parameters):

CMDGOV->adef_mult	CMDGOV->armor_mult
CMDGOV->arty_mult	CMDGOV->helo_mult
CMDGOV->infty_mult	CREATE->gndforce
GROUND->kill	GROUND->wpn_scores
UNIT->convert	UNIT->effective
UNIT->kill	UNIT->log_level
UNIT->merge	UNIT->pos_alloc
UNIT->rearm	UNIT->re_assign
UNIT->to_wrm	UNIT->xfer_wpns

CMDGOV->adef_mult

Description: Air defense effectiveness multiplier for a Command (applicable to assigned ground units) or Government (applicable to ground units owned).

Default: 1.0

Maximum: 100.0

Minimum: .01

Example(s):

Cmd/Gov	Keyword	Value
set cmdgov AFSOUTH	adef_mult	1.5

CMDGOV->armor_mult

Description: Armor effectiveness multiplier for a Command (applicable to assigned units) or Government (applicable to units owned). Note that it multiplies the single effectiveness score (EED) of a unit by an amount proportional to that unit's armor holdings.

Default: 1.0

Maximum: 100.0

Minimum: .01

Example(s):

Cmd/Gov	Keyword	Value
set cmdgov AFSOUTH	armor_mult	1.5

CMDGOV->arty_mult

Description: Artillery effectiveness multiplier for a Command (applicable to assigned units) or Government (applicable to units owned). Note that it multiplies the single effectiveness score (EED) of a unit by an amount proportional to that unit's artillery holdings.

Default: 1.0

Maximum: 100.0

Minimum: .01

Example(s):

Cmd/Gov	Keyword	Value
set cmdgov AFSOUTH	arty_mult	1.5

CMDGOV->helo_mult

Description: Helicopter effectiveness multiplier for a Command (applicable to assigned ground units) or Government (applicable to ground units owned).

Example(s):

Cmd/Gov	Keyword	Value
set cmdgov France	helo_mult	.9

CMDGOV->infty_mult

Description: Infantry effectiveness multiplier for a Command (applicable to assigned units) or Government (applicable to units owned). Note that it multiplies the single effectiveness score (EED) of a unit by an amount proportional to that unit's infantry holdings.

Default: 1.0

Maximum: 100.0

Minimum: .01

Example(s):

Cmd/Gov	Keyword	Value
set cmdgov France	infty_mult	.9

CREATE->gndforce

Description: Allows the analyst to create new ground forces that were not in the original database.

Unit name: You must select a unique interface name for the force that meets the ground.sec naming convention, BUT ALSO you may NOT use a name that implies sisterhood with another force. For example, you could create a 32-ARMDIV, but you could NOT create a 32-ARMDIV/1-BRIGADE (i.e., no slashes allowed here). If you simply MUST have sisterhood, then go back to ground.sec and rerun the input processor.

Owner: Any government name.

Force-Like: You must select another (existing) force whose original weapons' TOE is to be used as the basis for creating the new force.

Size: Enter percentage of TOE to use (e.g., 100% means exactly as the named existing force was before it suffered any attrition). Regardless of the percentage stated, the new force will have at least one weapon of every type for which the existing force TOE calls for one or more weapons. The minimum value of size is 25%, the maximum is 200%.

Location: Enter the land region, place, or between-place position where the force is to be located.

Note: Use the Assign order to specify a command for the force.

The example below would create a new SKorean force 32-ARMDIV with TOE exactly 90% of the weapons of the US 1-ARMD, and place it on the network between Seoul and Kimpo, 10 kilometers from Seoul.

Example(s):

Keyword	Unit-Name	Owner	Force-Like	Size	Location	
set create	gndforce	32-ARMDIV	SKorea	1-ARMD[US]	90%	Seoul/10Kms/Kimpo

GROUND->kill

Description: Event type kill causes instantaneous attrition to all specified forces. The attrition will be uniformly distributed across all types of weapon systems in the affected forces, and the attrition caused will appear in the other losses data in any history file graphics.

The user may use "all" in the Owner field, but must specify a location that must be either a land region or an overlay region.

Maximum: .99

Minimum: 0.0

Example(s):

Keyword	Owner	Location	Fraction	
set ground	kill	NKor	skorea	.33

GROUND->wpn_scores

Description: This script allows a user to multiply all the scores of ground forces by owner and/or command for a particular weapon type. Weapon types are:

```
tank    ifv    apc    hvy_arv    lgt_arv    lr_atgm    sr_atgm  
sm_mortar    sm_arms    sp_artillery    td_artillery    gdad_ahead    oir_ahead    atk_helo
```

This script will NEVER cause scores to go to zero when the physical count of surviving weapons is positive.

The script affects operational units, POMCUS/MPS stocks, and WRM.

Note: This script is usable only for a time-zero WSDS.

Maximum: 2.0

Minimum: .2

Example(s):

Keyword	Weapon	Owner	Command	Multiplier
set ground	wpn_scores	tank	US	CEur
				.5

UNIT->convert

Description: This option allows the user to cause an Airborne or Airmobile force that is already located in a theater to be converted into a force that is of type Infantry so that it can subsequently be treated as just another maneuver force in-theater. Such conversions are irrevocable.

Note: The Infantry type specified MUST have the same value for perdiv (in the data file ground.sec) as the force type being converted.

Example(s):

Keyword	Unit	Name	Owner	Inf	Type
set unit	convert	82-Abn	US	US_ID	

UNIT->effective

Description: Sets the effectiveness multiplier for the unit.

Maximum: 1000

Minimum: 0

Example(s):

Keyword	Name	Owner	Multiplier	
set unit	effective	2-Armd/3-Bde	US	1.5

UNIT->kill

Description: This option allows the user to attrite a named ground or air force. For a ground unit, kills must be specified as a fraction of the unit, and therefore must be a value greater than 0 and less than or equal to 1. For air units, kills may either be a fraction (of aircraft on the ground) or in the form #n, meaning that n aircraft are killed.

Example(s):

	Keyword	Unit Name	Owner	Kills
	set unit	kill	2-Armd/3-Bde	US
	set unit	kill	32-TFW/201-TFS	US
	set unit	kill	55-TFW/505-TFS	US
				#10

UNIT->log_level

Description: Sets an individual log-level for a unit.

Maximum: 5

Minimum: 0

Example(s):

	Keyword	Name	Owner	Log Level
	set unit	log_level	2-Armd/3-Bde	US
				5

UNIT->merge

Description: This option allows the user to merge the first named ground unit into the second (the first goes out of existence irrevocably).

Limitation: The unit to be merged cannot currently be deploying. If it is, you must use FORCE->stop_move to terminate the deployment.

Warning: If the specified ground type (Gtype) does not correctly represent the size unit that results from the merger (e.g., the merger of a brigade with 2 brigades yields a division), all displays that account forces by number of divisions will obviously be adversely affected. Similarly, if the new type is inappropriate, the subsequent simulation may be flawed (e.g., if you merge infantry and artillery and specify the result to be armored or amphibious).

Example(s):

	Keyword	To Be Merged	Merge Into New Gtype
	set unit	merge	1-CORPS/25-IDF[skor]
			1-CORPS/28-IDR[skor]
			KID

UNIT->pos_alloc

Description: This option allows the user to precisely control the allocation of an in-position ITM positional ground force. The allocation is a vector of four percentages adding up to 100%. The percentages apply to the unit's front, rear, flank, and amid (internal battles). This script cannot be used unless the force already has a positional mission.

The following limitations apply:

The allocation to Front must be at least 10%.

An allocation to Amid is accepted, but a positional force cannot have any internal battles, so the allocation has no modeling effect.

The allocation will be ignored IF it fails to cover a valid current threat, e.g., when the Flank allocation is 0% but there is an enemy at the Flank, the allocation will be ignored (and the normal allocation model will obtain).

To cancel an existing allocation, simply make all percentages 0.

Note: When a scripted allocation is not provided, or is provided but cannot be used for the reasons specified above, the normal model for auto-allocation to Front, Rear, Flank, and Amid applies. But when a scripted allocation is used, it is used blindly, i.e., what you have specified is what the unit does, period, however illogical that may be vis-à-vis the current enemy situation. For example, if the enemy situation is 100% Front and 0% everywhere else, and you script 10% Front and 90% Rear, only 10% will fight the enemy at the Front.

Example(s):

	Keyword	Unit [Owner]	Front	Rear	Flank	Amid
set unit	pos_alloc	24-mxd[us]	60%	10%	30%	0%
set unit	pos_alloc	24-mxd[us]	0%	0%	0%	0%

--- to cancel

UNIT->rearm

Description: This option allows the user to fill a ground unit's TOE. Weapons needed are created instantaneously (not taken from or limited by stocks). The unit cannot be on deployment orders, or be destroyed, broken, etc.

Example(s):

	Keyword	Unit [Owner]
set unit	rearm	24-mxd[us]

UNIT->re_assign

Description: This option allows the user to transfer the parentage of a unit to another parent unit. The example will cause the 3rd-Bde of the 2nd-Armored Division to become a brigade of the 1st Armored Division. Note that it will be given a new name to distinguish it from other brigades in the receiving unit. The new name will be displayed when the script is processed.

Example(s):

Keyword	Transferee	Owner	Receiver
set unit re_assign	2-Armd/3-Bde	US	1-Armd

UNIT->to_wrm

Description: This option allows the user to have a ground force deleted as an explicit unit and all its surviving equipment to be added to the WRM (war reserve materiel) account in the region where the force is located.

Example(s):

Keyword	Unit Name	Owner
set unit to_wrm	2-Armd/3-Bde	US

UNIT->xfer_wpns

Description: This option allows the user to transfer weapons from one ground force to another. Weapon types are:

tank ifv apc hvy_arv lgt_arv lr_atgm sr_atgm
sm_mortar sm_arms sp_artillery td_artillery gdad_ahead oir_ahead atk_helo

Example(s):

Keyword	Losing Unit[Owner]	Gaining Unit[Owner]	Weapon	Frac	or #
set unit xfer_wpn	5-Corps/3-ID[Skor]	5-Corps/8-ID[Skor]	tank	.33	
set unit xfer_wpn	5-Corps/3-ID[Skor]	5-Corps/8-ID[Skor]	sp_artillery	#8	

J. Parameters for: Ground<>network

CONTENTS (8 parameters):

LANDWAR->terrain	LOC->delay
LOC->location	LOC->max_speed
LOC->min_speed	LOC->path
LOC->sorts_day	REGION->refugees

LANDWAR->terrain

Description: Allows the user to script terrain data between two places connected by a network link. Up to 10 sequential data records can be defined between two connected places, BUT all terrain data for a link must be given within a single set. If a link already has terrain data, this set of data replaces it.

Enter “-” at the Command prompt.

Types of terrain are: open mixed rough urban mountain river

Shoulder space is the average military width of the terrain.

A “-” at the Kms, or % of Total prompt means all the rest, and cancels the requirement to end the script with “end”.

Note: Use of Kms instead of % will NOT increase accuracy, which is limited to what can be obtained by specifying integer percents.

The example below demonstrates how to break the terrain between Seoul and Kimpo into 3 sections. The first two sections cover 25% of the total distance (each), and the third covers the remaining 50% of the distance. Note that the script ends with the string “end”.

Example(s):

Command	Keyword	From	To	Terrain Type	Shoulder Space (Kms)	Kms, or % of Total	Total Distance
set landwar	- terrain	Seoul	Kimpo	Urban	25.0	25%	
				Mixed	15.0	25%	
				Open	40.0	50%	end

LOC->delay

Description: Allows user to simulate LoC damage by closing a link for a specified number of hours. This LoC damage affects administratively deploying ground forces, NOT tactically moving units.

Hours closed are from the time the script is issued. It is a set, not an addition. Thus, if you specified 0, you could override any earlier scripted delay that had not yet expired. Dynamically adjudicated delays (resulting from air attacks targeted THTR_loc against a link) are in addition to this scripted delay, although each use of the script overrides any previously adjudicated delay.

Forces DO NOT reroute because of this script, and any forces already planning to use this link WILL BE delayed for the duration.

Maximum: 240 (10 days)

Minimum: 0

Example(s):

Keyword	Link	Hours
set LoC delay	Seoul/Uijongbu	12

LOC->location

Description: Allows user to establish predefined positions on the networks, after which those positions can be referred to simply by the name stated in the script.

The location name cannot conflict with the name of any place, or with any previously defined path names or location names (see set LoC path documentation).

The position defined may simply be a place (although why one would wish to do this is not immediately clear), or a between-place position, e.g., placename-a/xxxKms/placename-b, in which case the position is xxx kilometers from placename-a on the link to placename-b.

Example(s):

Keyword	Name	Position string
set LoC location	POS-alfa	Uijongbu/15Kms/Seoul

LOC->max_speed

Description: The maximum allowable movement speed on this link in KPD. This speed applies when the value of REGION->refugees is 0%. But as REGION->refugees ranges to 100%, allowable movement speed varies linearly between LOC->max_speed and LOC->min_speed.

So long as LOC->min_speed >= LOC->max_speed (as it is in default data for all links), then REGION->refugees has no effect on the link. To make the refugee congestion model work, reset the values of BOTH LOC->max_speed and LOC->min_speed (and, of course, REGION->refugees).

Resetting options affects tactical and deployment movements on the link.

Default: 10000 (congestion model is off)

Maximum: 10000 KPD (model off)

Minimum: 1 KPD

Example(s):

Keyword	Link	KPD
set LoC	max_speed	Seoul/Uijongbu 200

LOC->min_speed

Description: The minimum allowable movement speed on this link, in KPD. This speed applies when the value of REGION->refugees is 100%. But as REGION->refugees ranges to 100%, allowable movement speed varies linearly between LOC->max_speed and LOC->min_speed.

So long as LOC->min_speed \geq LOC->max_speed (as it is in default data for all links), then REGION->refugees has no effect on the link. To make the refugee congestion model work, reset the values of BOTH LOC->max_speed and LOC->min_speed (and, of course, REGION->refugees).

This affects tactical and deployment movements on the link.

Default: 10000 (congestion model is off)

Maximum: 10000 KPD (model off)

Minimum: 1 KPD

Example(s):

Keyword	Link	KPD
set LoC	min_speed	Seoul/Uijongbu 10

LOC->path

Description: Allows user to establish predefined paths across the networks, after which those paths can be referred to simply by the name stated in the script.

The path name cannot conflict with the name of any place, or with any previously defined path names or location names (see set LoC location documentation).

The path defined must require no intermediate routing, i.e., there MUST be a direct network link (see data in places.unc) between every adjacent pair of places mentioned in the path string.

No place may be mentioned more than once in the path (no loops).

Example(s):

Keyword	Name	Path
set LoC	path	LOC-alfa Uijongbu>Seoul>Kimpo>Inchon

LOC->sorts_day

Description: Allows user to specify how much LoC damage is caused by air attack. The damage metric is number of equivalent sorties to cause 24-hour closure of the link. Adjudicated LoC damage causes delay affecting administratively deploying ground forces, NOT tactically moving units.

Forces DO NOT reroute because of adjudicated delays, so any forces already planning to use a link WILL BE delayed.

See also LOC->delay.

Default: 0

Maximum: 250

Minimum: 0 (meaning LoC cannot be closed)

Example(s):

Keyword	Link	Eq Sorts / Day
set LoC sorts_day	Seoul/Uijongbu	20

REGION->refugees

Description: Current extent of the refugee problem in this region as it affects LoC congestion. If 0%, then no problem exists; if 100%, then problem is the worst possible.

See documentation for LOC->max_speed and LOC->min_speed for effect of REGION->refugees.

Example(s):

Region	Keyword	Value
set region skorea	refugees	20%

K. Parameters for: Ground<>commands

CONTENTS (8 parameters):

COMMAND->call_plan	COMMAND->create
COMMAND->deorient	COMMAND->intra_cgo
COMMAND->intra_pax	COMMAND->log_level
COMMAND->orient	COMMAND->superior

COMMAND->call_plan

Description: Allows user to specify the name of an Abel Contingency plan (defined in Abel/Plan and called from Abel/contingency.A) to be automatically invoked when the commands MOFL or CONL reach a specified position.

The command specified MUST already be oriented (see set command orient) and have a current ITM land combat mission (see CMD-Mission order).

The Plan-Name must be spelled precisely as the plan function name is, i.e., case and punctuation matter.

Mode may be either mofl or conl.

Position is any place on the command's mission path EXCEPT its current position.

Example(s):

Keyword	Command	Plan-Name	Mode	Position
set command	call_plan	KS-11	Plan-WXYZ	mofl Seoul/10Kms/Kimpo

COMMAND->create

Description: Allows user to create a new command. A superior and an associated location are defined for the command, either of which may be -.

Example(s):

Keyword	New Command	Superior	Location
set command	create	AG-Gamma	NATO
			Switzerland

COMMAND->deorient

Description: Use this option to cancel an existing command orientation (prior to re-orienting a command).

Note: Canceling an orientation of necessity cancels existing missions and echelonment as well. If you cancel the orientation for ANY command in an echelonment, it is as though you issued a cancel for ALL commands in the echelonment.

Example(s):

Keyword	Command
set command deorient	KN-3W

COMMAND->intra_cgo

Description: Sets the percentage of a LIFT command-assigned cargo aircraft that is to be used for intra-theater requirements (and is thus not available for strategic airlift requirements).

Default: 10 for all lift commands

Maximum: 95

Minimum: 0

Example(s):

Keyword	Name	Percent
set command intra_cgo	CFCK	25

COMMAND->intra_pax

Description: Sets the percentage of a LIFT command-assigned troop aircraft that is to be used for intra-theater requirements (and is thus not available for strategic airlift requirements).

Default: 10 for all lift commands

Maximum: 95

Minimum: 0

Example(s):

Keyword	Name	Percent
set command intra_pax	CFCK	25

COMMAND->log_level

Description: Sets an individual log-level for a command.

Maximum: 5

Minimum: 0

Example(s):

Keyword	Name	Log Level
set command log_level	KS-11	5

COMMAND->orient

Description: Specifies the orientation of an ITM ground force command, making it potentially eligible for Cmd-mission orders and ITM ground combat. Only a subordinate of a theater command may accept script command orient, and it must be a first-echelon (or non-echeloned) command with NO subordinate commands.

To reorient a command, you must first use the "set command deorient" option (which is the only way to cancel an existing orientation).

The orientation string consists of at least 2 and as many as 4 parts, all strung together with NO intervening blank spaces:

The REAR part is optional, and when used specifies the position at the rear of the command. It may be specified as a distance behind the CONL position (see below) in kilometers, e.g., (31.5Kms), or it may be an explicit position, e.g., (Seoul) or (Seoul/10.1Kms/Uijongbu). It may also be the name of a predefined position (see the documentation for set LOC location), e.g., (DMZ-4), if that is a preset name. If this part is omitted, it will be as though (25.0Kms) had been typed.

The CONL part is mandatory and must be either an explicitly stated position or the name of a predefined position, as just described above. It describes the forwardmost position of the command being oriented.

The PATH part is mandatory and must be either an explicitly stated sequential path, e.g., Uijongbu>Seoul>Kimpo>Inchon, or the name of a predefined path (see the documentation for set LOC path), e.g., Uijongbu-Inchon, if that is a preset name.

The REVERSE part is only used IF the PATH specified is logically backwards. For example, if Uijongbu-Inchon has been defined as Uijongbu>Seoul>Kimpo>Inchon, its directionality is from Uijongbu to Inchon. If you wished a command to be along that path but its orientation is opposite the path direction, use a "—" for the REVERSAL part.

Thus: (10.0Kms)Uijongbu-Inchon(Seoul/20Kms/Uijongbu) places the CONL of the command 20 Kms from Seoul and the rear 30 Kms from Seoul (the command is facing Seoul).

But: -(10.0Kms)Uijongbu-Inchon(Seoul/20Kms/Uijongbu) places the CONL of the command 20 Kms from Seoul and the rear 10 Kms from Seoul (the command is facing Uijongbu).

Example(s):

Keyword	Command	Orientation String Parts
set	command orient	KN-3W REVERSE (REAR) PATH (CONL)

COMMAND->superior

Description: Resets the immediate superior of a given command.

Note: It does NOT change what governments have joined or granted control to the affected command.

Example(s):

Keyword	Command	Superior
set	command superior	FR-Balkan HCF_W

L. Parameters for: Ground<>arty_ops

CONTENTS (12 parameters):

ARTY->art_req_arm	ARTY->art_timing
CMDGOV->cntr_battery	CMDGOV->cntr_manvr
CMDGOV->deep_fires	LANDWAR->arty_escape_pct
LANDWAR->arty_range_kms	LANDWAR->arty_trap_pct
LANDWAR->cntr_batt_pct	LANDWAR->cntr_batt_wgt
LANDWAR->dir_fire_range	LANDWAR->init_art_prep

ARTY->art_req_arm

Description: Minimum number of vehicle targets in an enemy unit if the unit is to be considered a viable target for long-range artillery engagement.

See ITM->vehicle_kills in Appendix Y for arty kill data.

Default: 20

Maximum: 500

Minimum: 0

Example(s):

Command	Keyword	New Value
set arty	KS_11	art_req_arm
		15

ARTY->art_timing

Description: The percentage of a command's total long-range artillery that will be shot in each 4-hour period of the ITM day. Note that it is based on assigned command, not supported command.

See ITM->vehicle_kills in Appendix Y for arty kill data.

Default: 0 0 40 30 30 0

Example(s):

Command	Keyword	A New Percent for Each Period					
		1	2	3	4	5	6
set arty	KS_11	art_timing	10	20	30	20	20
							0

CMDGOV->cntr_battry

Description: Counter-battery fire effectiveness multiplier for a Command (applicable to assigned ground units) or Government (applicable to ground units owned).

Default: 1.0

Maximum: 100.0

Minimum: .01

Example(s):

Cmd/Gov	Keyword	Value
set cmdgov	AFSOUTH	cntr_battry
		1.5

CMDGOV->cntr_manvr

Description: Counter-manuever fire effectiveness multiplier for a Command (applicable to assigned ground units) or Government (applicable to ground units owned).

Default: 1.0

Maximum: 100.0

Minimum: .01

Example(s):

Cmd/Gov	Keyword	Value
set cmdgov	AFSOUTH	cntr_manvr
		1.5

CMDGOV->deep_fires

Description: Deep fire effectiveness multiplier for a Command (applicable to assigned ground units) or Government (applicable to ground units owned). NOT USED

Default: 1.0

Maximum: 100.0

Minimum: .01

Example(s):

Cmd/Gov	Keyword	Value
set cmdgov	AG-Italy	deep_fire
		1.1

LANDWAR->arty_escape_pct

Description: Percentage of a positional maneuver force's artillery that transfers to its positional command's separate artillery force when the maneuver force is overrun at the command's forward battle.

Default: 70

Maximum: 100

Minimum: 0

Example(s):

Command	Keyword	Per cent
set landwar	CFCK	arty_escape_pct
		45%

LANDWAR->arty_range_kms

Description: Kilometers forward of a command's front that the command can engage an enemy when it is not in contact with any enemy.

Note: 0 means NO out-of-contact artillery battles

Default: 10

Maximum: 50

Minimum: 0

Example(s):

Command	Keyword	Kilometers
set landwar	CFCK	arty_range_kms
		10

LANDWAR->arty_trap_pct

Description: Percentage of a positional command's separate artillery that transfers to a positional command's forward maneuver force when the maneuver force is overrun at the command's forward battle.

Default: 30

Maximum: 100

Minimum: 0

Example(s):

Command	Keyword	Per cent
set landwar	CFCK	arty_trap_pct
		45%

LANDWAR->cntr_batt_pct

Description: When less than or equal to 100, this is the percentage of artillery EDs that are allocated to counter-battery fire. The remainder are allocated to counter-maneuver. When set equal to 101%, an ABEL model (function Determine-cntr-bttry-frac in file sfs.A) determines the allocation.

Default: 101

Maximum: 101

Minimum: 0

Example(s):

Command	Keyword	Value
set landwar KN-7	cntr_batt_pct	60

LANDWAR->cntr_batt_wgt

Description: The weight accorded to artillery forces when calculating the fraction of artillery to allocate to counter-maneuver instead of counter-battery (function Determine-cntr-bttry-frac in file sfs.A). This parameter is not used when LANDWAR->cntr_batt_pct is set to 100% or less, which sets the allocation directly.

Default: 1.0

Maximum: 1000.0

Minimum: 0.001

Example(s):

Command	Keyword	Value
set landwar KN-7	cntr_batt_wgt	2.5

LANDWAR->dir_fire_range

Description: Average range (km) of direct-fire weapons.

Default: 5

Example(s):

Command	Keyword	Range
set landwar KN-7	dir_fire_range	10

LANDWAR->init_art_prep

Description: Number of days of wartime preparation equivalent to peacetime preparation done for artillery.

Default: 20

Maximum: 250

Minimum: 1

Example(s):

Command	Keyword	Days
set landwar KN-7	init_art_prep	30

M. Parameters for: Ground<>combat_adjud

CONTENTS (29 parameters):

ITM->aarmor_req_mult	ITM->aarty_req_mult
ITM->ainf_req_mult	ITM->armor_per_km
ITM->armor_req_mult	ITM->arty_per_km
ITM->arty_req_mult	ITM->att_mult
ITM->coh_curve_frac	ITM->flank_mult
ITM->gnd_timing	ITM->heavy_mult
ITM->inf_req_mult	ITM->infty_per_km
ITM->lr_art_mult	ITM->lr_oas_mult
ITM->minefield	ITM->mine_kills
ITM->overrun_mult	ITM->rear_mult
ITM->shock_hours	ITM->shock_mult
ITM->thin_defense	ITM->vel_lim_mult
ITM->vel_mult	LANDWAR->force_break
LANDWAR->hold_density	LANDWAR->kv_board
LANDWAR->min_density	

ITM->aarmor_req_mult

Description: Multiplier of the SED density of anti-armor required to prevent a shortage.

Default: 1.0

Maximum: 10.0

Minimum: .1

Example(s):

Theater	Keyword	New Value
set itm	CFCK	aarmor_req_mult .2

ITM->aarty_req_mult

Description: Multiplier of the SED density of anti-artillery required to prevent a shortage.

Default: 1.0

Maximum: 10.0

Minimum: .1

Example(s):

Theater	Keyword	New Value
set itm	CFCK	aarty_req_mult
		.2

ITM->ainf_req_mult

Description: Multiplier of the SED density of anti-infantry required to prevent a shortage.

Default: 1.0

Maximum: 10.0

Minimum: .1

Example(s):

Theater	Keyword	New Value
set itm	CFCK	ainf_req_mult
		.2

ITM->armor_per_km

Description: Number of armored vehicles per km of terrain width that can fight. Terrain width is set by LANDWAR->terrain.

Default: 40

Maximum: 10000

Minimum: .1

Example(s):

Theater	Keyword	New Value
set itm	CFCK	armor_per_km
		40

ITM->armor_req_mult

Description: Multiplier of the SED density of armor required to prevent a shortage.

Default: 1.0

Maximum: 10.0

Minimum: .1

Example(s):

	Theater Keyword	New Value
set item	CFCK	armor_req_mult
		.2

ITM->arty_per_km

Description: Number of artillery per km of terrain width that can fight. Terrain width is set by LANDWAR->terrain.

Default: 1000

Maximum: 10000

Minimum: .1

Example(s):

	Theater Keyword	New Value
set item	CFCK	arty_per_km
		1000

ITM->arty_req_mult

Description: Multiplier of the SED density of artillery required to prevent a shortage.

Default: 1.0

Maximum: 10.0

Minimum: .1

Example(s):

	Theater Keyword	New Value
set item	CFCK	arty_req_mult
		.2

ITM->att_mult

Description: Multiplier of attrition from maneuver combat.

Default: 1.0

Maximum: 10.0

Minimum: .1

Example(s):

Theater	Keyword	New Value
set itm	CFCK	att_mult
		.95

ITM->coh_curve_frac

Description: The fractional value of cohesion (cohesion%/100%) below which the cohesion multiplier of EEDs decreases linearly from 1.0 to 0.0.

Default: .80

Maximum: 1.0

Minimum: .01

Example(s):

Theater	Keyword	New Value
set itm	CFCK	coh_curve_frac
		.70

ITM->flank_mult

Description: Relative-threat value of contact on the flanks versus on the front.

Default: 1.5

Maximum: 5.0

Minimum: 1.0

Example(s):

Theater	Keyword	New Value
set itm	CFCK	flank_mult
		1.2

ITM->gnd_timing

Description: Vector of 6 percentages adding to 100 that define what percentage of a day's worth of ground combat results belongs in each of the 6 4-hour delta-t's simulated by ITM.

If theater sides have different values, the attacker's data are used for in-contact calculations. Each side uses its own vector for non-contact movement.

Default: 16.67 each period

Maximum: 100.0 in any period

Minimum: 0.0 in any period

Example(s):

Theater Keyword		6 New Values adding to 100 percent						
set item	CFCK	gnd_timing	0%	40%	30%	20%	5%	5%

ITM->heavy_mult

Description: Relative-threat value of contact with an armored or mech enemy force versus other types of forces.

Default: 2.0

Maximum: 5.0

Minimum: 1.0

Example(s):

Theater Keyword		New Value	
set item	CFCK	heavy_mult	1.2

ITM->inf_req_mult

Description: Multiplier of the SED density of infantry required to prevent a shortage.

Default: 1.0

Maximum: 10.0

Minimum: .1

Example(s):

Theater Keyword		New Value	
set item	CFCK	inf_req_mult	.2

ITM->infty_per_km

Description: Number of infantry weapons per km of terrain width that can fight. Terrain width is set by LANDWAR->terrain.

Default: 120

Maximum: 10000

Minimum: .1

Example(s):

	Theater Keyword	New Value
set itm	CFCK	infty_per_km
		120

ITM->lr_art_mult

Description: A multiplier of the contribution of ground losses caused by LR arty to the FLOT movement rate. FLOT movement is a function of the total loss rates of ground forces of the attacker and defender. Losses caused by LR arty may have a larger effect on FLOT movement than losses from ground combat if intelligence allows arty to be focused at critical places and times.

Default: 1.0

Maximum: 100.0

Minimum: .1

Example(s):

	Theater Keyword	Value
set itm	CFCK	lr_art_mult
		4.0

ITM->lr_oas_mult

Description: A multiplier of the contribution of ground losses caused by OAS sorties to the FLOT movement rate. FLOT movement is a function of the total loss rates of ground forces of the attacker and defender. Losses caused by OAS sorties may have a larger effect on FLOT movement than losses from ground combat if intelligence allows sorties to be focused at critical places and times.

Default: 1.0

Maximum: 100.0

Minimum: .1

Example(s):

	Theater Keyword	Value
set itm	CFCK	lr_oas_mult
		4.0

ITM->minefield

Description: Permits creation of minefields and changes to density of existing ones, including setting density to 0, which clears the minefield. Minefields are owned by the theater that creates them and are of Type vehicle or infantry.

Minefields can be located only on explicitly created terrain (i.e., terrain that was created using LANDWAR->terrain), and a minefield that is on such a terrain segment covers the segment's entire length and width. To create a minefield 5 Kms long in a terrain segment that is 10 Kms long, use LANDWAR->terrain to re-create the terrain segments on that link to the desired sizes. Doing so will, of course, eliminate any existing minefields on that link.

You must specify some position WITHIN the terrain segment to place the minefield. Use the terrain display to see terrain-segment extents. For example, the terrain display for Seoul to Uijongbu shows:

13.8 Kms of 12.0Km-wide Urban terrain

FROM Seoul TO Seoul/13.8Kms/Uijongbu

14.4 Kms of 12.0Km-wide Mixed terrain

FROM Seoul/13.8Kms/Uijongbu TO Uijongbu

The position in the first example below identifies the first segment (since 9 Kms from Seoul is within the first segment's limits). If you happen to know the percentages you used when creating the segments, you can use intermediate values instead of kilometer points. In the second example, the 25% position clearly identifies the first segment.

You may NOT simply specify a place name (e.g., seoul), since that does not identify a link at all.

See documentation for ITM->mine_kills below for minefield effects data.

Default: No land minefields anywhere.

Maximum: 10 density

Minimum: 0 density

Example(s):

Theater	Keyword	Position	Type	Density
set itm CFCK		minefield seoul/9Km/uijongbu	vehicle	1.0
set itm CFCK		minefield seoul/25%/uijongbu	vehicle	1.2

ITM->mine_kills

Description: Fraction of vehicles (or infantry) killed by a minefield of density 1.0 for each kilometer of length traversed. These kills are applied to an advancing enemy command's at-Flot forces as they traverse the length of terrain segment where the minefield is scripted.

A data set consists of kill rates for vehicular and infantry mines, and a separate data set is needed for two Statuses: opposed and unopposed.

Loss rates vary linearly as the density of a minefield varies from 1.0.

After a command has traversed a field, its density is set to 0.0.

See documentation for ITM->minefield in Appendix G for creation of minefields.

Default: .01/.005 for opposed/unopposed vehicle and infantry, for all Theaters

Maximum: .25

Minimum: .001

Example(s):

Theater	Keyword	Status	Veh	Inf
set item	CFCK	mine_kills	opposed	.02 .01

ITM->overrun_mult

Description: EED multiplier for overrun ground forces.

Default: .50

Maximum: 1.0

Minimum: .1

Example(s):

Theater	Keyword	New Value
set item	CFCK	overrun_mult .70

ITM->rear_mult

Description: Relative threat value of contact at the rear versus at the front.

Default: 2.0

Maximum: 5.0

Minimum: 1.0

Example(s):

Theater	Keyword	New Value
set item	CFCK	rear_mult 1.2

ITM->shock_hours

Description: How long EED multiplier shock_mult takes to linearly return to 1.0 after flank or rear contact is made.

Default: 48.0

Maximum: 960.0

Minimum: 0.0

Example(s):

	Theater Keyword	New Value
set itm	CFCK	shock_hours
		48

ITM->shock_mult

Description: EED multiplier when first contacted by enemy on the flank or rear. Value used linearly returns to 1.0 over ITM->shock_hours.

Default: .5

Maximum: 1.0

Minimum: .20

Example(s):

	Theater Keyword	New Value
set itm	CFCK	shock_mult
		.5

ITM->thin_defense

Description: Specifies whether prepared and fortified defenses are thin (as in Korea) or robust (as in Europe).

Default: Off (meaning robust)

Example(s):

	Theater Keyword	New Value
set itm	CFCK	thin_def
		On or Off

ITM->vel_lim_mult

Description: Multiplier of the terrain limit on FLOT movement rate (found in file Force-C/Abel/Model/combat.A).

Default: 1.0

Maximum: 5.0

Minimum: .01

Example(s):

	Theater Keyword	New Value
set itm	CFCK	vel_lim_mult
		.40

ITM->vel_mult

Description: Multiplier of FLOT movement rate.

Default: 1.0

Maximum: 10.0

Minimum: .1

Example(s):

	Theater	Keyword	New Value
set itm	CFCK	vel_mult	1.1

LANDWAR->force_break

Description: Level of cohesion (%) at which units are totally non-functional.

Default: 30

Example(s):

	Command	Keyword	Level
set landwar	KN-7	force_break	20%

LANDWAR->hold_density

Description: Defender's SED/km density above which an attacker's advance is below the normally calculated movement (hold_density < min_density < brk_density).

Default: .1

Example(s):

	Command	Keyword	Density
set landwar	KN-5C	hold_density	0.1

LANDWAR->kv_board

Description: Writes a Killer-Victim (KV) scoreboard for every changing combat situation to the .log file. The scoreboard is a table describing the number of enemy weapons in each category killed by each friendly weapon. Losses are given as if the combat had lasted for an entire day.

Note that this table is calculated from the results of the battle in which the command is involved; it may involve friendly forces from other commands. Also, a new scoreboard is written for each subdelta, since subdeltas are triggered by a change in the combat situation.

Default: Off

Example(s):

Command	Keyword	On/Off
set landwar KN-7	kv_board	On

LANDWAR->min_density

Description: Defender's SED/km density below which an attacker's advance is above the normally calculated movement (hold_density<min_density<brk_density).

Default: .05

Example(s):

Command	Keyword	Density
set landwar KN-5C	min_density	0.1

N. Parameters for: Ground<>environment

CONTENTS (9 parameters):

LANDWAR->bld_barrier	LANDWAR->del_barriers
LANDWAR->terrain	MATERIEL->dlib_depth
MATERIEL->dlib_rate	MATERIEL->fort_left
MATERIEL->fort_rate	MATERIEL->prep_left
MATERIEL->prep_rate	

LANDWAR->bld_barrier

Description: Allows the user to script, or order to be built, land combat defenses.

Type may be deliberate, prepared, or fortified.

The orientation string consists of at least 3 and as many as 4 parts, all strung together with NO intervening blank spaces:

The REAR part is mandatory. It is the depth of defenses, in kilometers.

The FRONT part is mandatory and must be either an explicitly stated position or the name of a predefined position (see set LOC location in Appendix J). It describes the forwardmost position of the defenses.

The PATH part is mandatory and must be either an explicitly stated sequential path, e.g., Uijongbu>Seoul>Kimpo>Inchon, or the name of a predefined path (see the documentation for set LOC path in Appendix J), e.g., Uijongbu-Inchon if that is a preset name.

The REVERSE part is used only IF the PATH specified is logically backwards. For example, if Uijongbu-Inchon has been defined as Uijongbu>Seoul>Kimpo>Inchon, its directionality is from Uijongbu to Inchon. If you wished a barrier to be along that path but its orientation is opposite the path direction, use a - for the REVERSAL part.

Thus: (10.0Kms)Uijongbu-Inchon(Seoul/20Kms/Uijongbu) places the FRONT of the barrier 20 Kms from Seoul and the rear 30 Kms from Seoul (the barrier is facing Seoul).

But: -(10.0Kms)Uijongbu-Inchon(Seoul/20Kms/Uijongbu) places the FRONT of the barrier 20 Kms from Seoul and the rear 10 Kms from Seoul (the barrier is facing Uijongbu).

A dash in the Set or - field means order these defenses built. But set means script them into existence immediately. Note, when Type is deliberate, it is always as though set were typed.

Example(s):

Command	Keyword	Type	Orientation String	Set or -
set landwar	KS-11	bld_barrier	prepared REVERSE(REAIR) PATH(FRONT)	set

LANDWAR->del_barriers

Description: Allows the user to script immediate destruction of any defenses located between any pair of PLACES on a path.

The orientation string consists of at least 3 and as many as 4 parts, all strung together with NO intervening blank spaces:

The REAR part is the rearmost place (e.g., Seoul). If REAR is omitted, then the user is assumed to mean the last place on the path.

The FRONT part is the forwardmost place. If FRONT is omitted, then the user is assumed to mean the first place on the path.

The PATH part must be either an explicitly stated sequential path, e.g., Uijongbu>Seoul>Kimpo>Inchon, or the name of a predefined path (see the documentation for set LOC path in Appendix J), e.g., Uijongbu-Inchon if that is a preset name.

The REVERSE part is used only IF the PATH specified is logically backwards. For example, if Uijongbu-Inchon has been defined as Uijongbu>Seoul>Kimpo>Inchon and you want barriers destroyed from (Kimpo/10/Inchon) (REAR) to (Seoul) (FRONT), you can either reverse the sense of the front and rear, or simply prepend the instruction with -.

Thus: -(Kimpo)Uijongbu-Inchon(Seoul) is the same as:

(Seoul)Uijongbu-Inchon(Kimpo)

Also, since Seoul and Kimpo are in fact adjacent, Seoul>Kimpo (omitting the FRONT and REAR parts) is also the same as the above two full examples.

Example(s):

Command Keyword	Orientation String
set landwar KS-11	del_barriers REVERSE (REAR) PATH (FRONT)

LANDWAR->terrain

Description: Allows the user to script terrain data between two places connected by a network link. Up to 10 sequential data records can be defined between two connected places, BUT all terrain data for a link must be given within a single set. If a link already has terrain data, this set of data replaces it.

Enter - at the command prompt.

Types of terrain are: open mixed rough urban mountain river

Shoulder space is the average military width of the terrain.

A - at the Kms or % of Total prompt means all the rest and cancels the requirement to end the script with "end".

Note: Use of Kms instead of % will NOT increase accuracy, which is limited to what can be obtained by specifying integer percents.

The example below demonstrates how to break the terrain between Seoul and Kimpo into 3 sections. The first two sections cover 25% of the total distance (each), and the third covers the remaining 50% of the distance. Note that the script ends with the string "end".

Example(s):

Command	Keyword	From	To	Terrain Type	Shoulder Space (Kms)	Kms, or % of Total Distance	
set	landwar	-	terrain	Seoul Kimpo	Urban	25.0	25%
				Mixed	15.0	25%	
				Open	40.0	50%	end

MATERIEL->dlib_depth

Description: Max. Kms. of Deliberate defenses that a force should build when able.

Default: 5

Maximum: 50

Minimum: 0

Example(s):

Theater	Keyword	New Value	
set	materiel CFCK	dlib_depth	20

MATERIEL->dlib_rate

Description: Kms. of Deliberate defenses that a force can build itself in a day.

Default: 1

Maximum: 50

Minimum: 0

Example(s):

Theater	Keyword	New Value	
set	materiel CFCK	dlib_rate	5

MATERIEL->fort_left

Description: Sq. Kms. of Fortified defenses that a theater can build total.

Default: 0

Maximum: 10000

Minimum: 0

Example(s):

Theater	Keyword	New Value
set materiel CFCK	fort_left	3000

MATERIEL->fort_rate

Description: Sq. Kms. of Fortified defenses that a theater can build in a day (so long as materiel are available—see MATERIEL->fort_left above).

Default: 210

Maximum: 10000

Minimum: 0

Example(s):

Theater	Keyword	New Value
set materiel CFCK	fort_rate	550

MATERIEL->prep_left

Description: Sq. Kms. of Prepared defenses that a theater can build total.

Default: 0

Maximum: 10000

Minimum: 0

Example(s):

Theater	Keyword	New Value
set materiel CFCK	prep_left	3000

MATERIEL->prep_rate

Description: Sq. Kms. of Prepared defenses that a theater can build in a day (so long as materiel are available—see MATERIEL->prep_left above).

Default: 1050

Maximum: 10000

Minimum: 0

Example(s):

Theater	Keyword	New Value
set materiel CFCK	prep_rate	550

O. Parameters for: Ground<>targeting_ground

CONTENTS (12 parameters):

AIRWAR->bai_bck_kms	AIRWAR->bai_bck_move
AIRWAR->bai_bck_still	AIRWAR->bai_fwd_kms
AIRWAR->bai_fwd_move	AIRWAR->bai_fwd_still
AIRWAR->bai_vehicles	AIRWAR->cas_vehicles
LANDWAR->art_target	LANDWAR->bai_target
LANDWAR->cas_target	LANDWAR->hel_target

AIRWAR->bai_bck_kms

Description: This option and AIRWAR->bai_fwd_kms define two zones along the supported command's path in which ground forces are targeted by BAI packages. The forward zone begins at the MOFL and ends at distance AIRWAR->bai_fwd_kms from the MOFL. The back zone begins at distance AIRWAR->bai_fwd_kms from the friendly MOFL and goes to distance AIRWAR->bai_fwd_kms + AIRWAR->bai_bck_kms.

The relative weight of effort allocated to each force is set by AIRWAR->bai_fwd_move, AIRWAR->bai_fwd_still, AIRWAR->bai_bck_move, and AIRWAR->bai_bck_still.

Default: 100

Maximum: 250

Minimum: 1

Example(s):

	Command	Keyword	Kms
set airwar	ROKAF	bai_bck_kms	100

AIRWAR->bai_bck_move

Description: Weight accorded a moving ground force in the back BAI zone (see AIRWAR->bai_fwd_kms) when allocating targets to BAI packages, relative to AIRWAR->bai_fwd_move, AIRWAR->bai_fwd_still, and AIRWAR->bai_bck_still. The number of packages allocated to the ground force is assigned according to whether the force qualifies (AIRWAR->bai_vehicles), original number of vehicles, then surviving vehicles.

Default: 10

Maximum: 250

Minimum: 1

Example(s):

Command	Keyword	Wgt
set airwar	ROKAF	bai_bck_move
		10

AIRWAR->bai_bck_still

Description: Weight accorded a still ground force in the back BAI zone (see AIRWAR->bai_fwd_kms) when allocating targets to BAI packages, relative to AIRWAR->bai_fwd_move, AIRWAR->bai_fwd_still, and AIRWAR->bai_bck_move. The number of packages allocated to the ground force is assigned according to whether the force qualifies (AIRWAR->bai_vehicles), original number of vehicles, then surviving vehicles.

Default: 1

Maximum: 250

Minimum: 1

Example(s):

Command	Keyword	Wgt
set airwar	ROKAF	bai_bck_still
		1

AIRWAR->bai_fwd_kms

Description: This option and AIRWAR->bai_bck_kms define two zones along the supported command's path in which ground forces are targeted by BAI packages. The forward zone begins at the MOFL and ends at distance AIRWAR->bai_fwd_kms from the MOFL. The back zone begins at distance AIRWAR->bai_fwd_kms from the friendly MOFL and goes to distance AIRWAR->bai_fwd_kms + AIRWAR->bai_bck_kms.

The relative weight of effort allocated to each force is set by AIRWAR->bai_fwd_move, AIRWAR->bai_fwd_still, AIRWAR->bai_bck_move, and AIRWAR->bai_bck_still.

Default: 100

Maximum: 250

Minimum: 1

Example(s):

Command	Keyword	Kms
set airwar	ROKAF	bai_fwd_kms
		100

AIRWAR->bai_fwd_move

Description: Weight accorded a moving ground force in the forward BAI zone (see parameter *bai_fwd_kms*) when allocating targets to BAI packages, relative to parameters *bai_fwd_still*, *bai_bck_move*, and *bai_bck_still*. The number of packages allocated to the ground force is assigned according to whether the force qualifies (AIRWAR->*bai_vehicles*), original number of vehicles, then surviving vehicles.

Default: 10

Maximum: 250

Minimum: 1

Example(s):

Command	Keyword	Wgt	
set airwar	ROKAF	bai_fwd_move	10

AIRWAR->bai_fwd_still

Description: Weight accorded a still ground force in the forward BAI zone (see AIRWAR->*bai_fwd_kms*) when allocating targets to BAI packages, relative to AIRWAR->*bai_fwd_move*, AIRWAR->*bai_bck_move*, and AIRWAR->*bai_bck_still*. The number of packages allocated to the ground force is assigned according to whether the force qualifies (AIRWAR->*bai_vehicles*), original number of vehicles, then surviving vehicles.

Default: 4

Maximum: 250

Minimum: 1

Example(s):

Command	Keyword	Wgt	
set airwar	ROKAF	bai_fwd_still	4

AIRWAR->bai_vehicles

Description: Minimum number of armored vehicles in a ground force to be a desirable BAI target. Equipment categories counted are tank, ifv, apc, hvy_arv, and lgt_arv.

Default: 40

Maximum: 250

Minimum: 0

Example(s):

	Command	Keyword	Qty
set airwar	ROKAF	bai_vehicles	40

AIRWAR->cas_vehicles

Description: Minimum number of armored vehicles in a ground force to be a desirable CAS target. Equipment categories counted are tank, ifv, apc, hvy_arv, and lgt_arv.

Default: 40

Maximum: 250

Minimum: 0

Example(s):

	Command	Keyword	Qty
set airwar	ROKAF	cas_vehicles	40

LANDWAR->art_target

Description: Allows user to specify the target for LR artillery supporting a command. The target may be a named ground force or a named enemy command. Stating a – at the target prompt means cancel existing targeting. When targeting has been set via this interface, the normal targeting logic is ignored in favor of the user's instructions.

Example(s):

	Command	Keyword	Enemy Command
set landwar	KS11	art_target	KN806

	Command	Keyword	Enemy Force and Owner
set landwar	KS11	art_target	3-Corps/1-Div NKorea

LANDWAR->bai_target

Description: Allows the user to specify the target for BAI supporting a command. The target may be a named ground force or a named enemy command. Stating a – at the target prompt means cancel existing targeting. When targeting has been set via this interface, the normal targeting logic is ignored in favor of the user's instructions.

Example(s):

	Command	Keyword	Enemy Command
set landwar	KS11	bai_target	KN806
	Command	Keyword	Enemy Force and Owner
set landwar	KS11	bai_target	3-Corps/1-Div NKorea

LANDWAR->cas_target

Description: Allows the user to specify the target for CAS supporting a command. The target may be a named ground force or a named enemy command. Stating a – at the target prompt means cancel existing targeting. When targeting has been set via this interface, the normal targeting logic is ignored in favor of the user's instructions.

Example(s):

	Command	Keyword	Enemy Command
set landwar	KS11	cas_target	KN806
	Command	Keyword	Enemy Force and Owner
set landwar	KS11	cas_target	3-Corps/1-Div NKorea

LANDWAR->hel_target

Description: Allows user to specify the target for AtkHelos supporting a command. The target may be a named ground force or a named enemy command. Stating a – at the target prompt means cancel existing targeting. When targeting has been set via this interface, the normal targeting logic is ignored in favor of the user's instructions.

Example(s):

	Command	Keyword	Enemy Command
set landwar	KS11	hel_target	KN806
	Command	Keyword	Enemy Force and Owner
set landwar	KS11	hel_target	3-Corps/1-Div NKorea

P. Parameters for: Ground<>operations

CONTENTS (28 parameters):

ITM->gnd_timing	ITM->max_length
ITM->place_control	ITM->place_value
LANDWAR->attk_cap	LANDWAR->attk_pull
LANDWAR->attk_reconst	LANDWAR->attk_replace
LANDWAR->axis_comm	LANDWAR->def_replace
LANDWAR->def_with	LANDWAR->delay_pct
LANDWAR->delay_rear	LANDWAR->dfdr_flank
LANDWAR->dfnd_pull	LANDWAR->dfnd_reconst
LANDWAR->dfnd_replace	LANDWAR->flank_dense
LANDWAR->flank_lim	LANDWAR->flank_withdr
LANDWAR->no_adv	LANDWAR->nuc_halt
LANDWAR->pos_pass	LANDWAR->pos_reconst
LANDWAR->rsv_bck_dist	LANDWAR->rsv_fwd_dist
LANDWAR->withd_pct	LANDWAR->withd_rear

ITM->gnd_timing

Description: Vector of 6 percentages adding to 100 that define what portion of a day's worth of ground combat results belongs in each of the 6 4-hour delta-t's simulated by ITM.

If theater sides have different values, the attacker's data are used for in-contact calculations. Each side uses its own vector for non-contact movement.

Default: 16.67 each period

Maximum: 100.0 in any period

Minimum: 0.0 in any period

Example(s):

Theater	Keyword	6 New Values adding to 100 percent
set item	CFCK	gnd_timing 0% 40% 30% 20% 5% 5%

ITM->max_length

Description: Maximum length, in kms, of a command's orientation.

Default: 100

Maximum: 200

Minimum: 25

Example(s):

	Theater Keyword	New Value
set itm	CFCK	max_length
		100

ITM->place_control

Description: Manually resets the current control of a named place to the owner of location of the named theater side. In the example, control of Pyongyang would be set to SKorea (which owns CFCK), regardless of whose forces are in or around Pyongyang.

Affects routing decisions but little (if anything) else.

Default: as in data file place.unc

Example(s):

	Theater Keyword	Place
set itm	CFCK	place_control
		pyongyang

ITM->place_value

Description: The value of a place when determining where reconstituting forces are to be positioned after their command has moved forward. Higher value is higher priority.

Default: 1 all places

Maximum: 30000

Minimum: 1

Example(s):

	Theater Keyword	Place Priority
set itm	CFCK	place_value
		Seoul 10000

LANDWAR->attk_cap

Description: Level of cohesion (%) required for a unit to attack.

Default: 70

Example(s):

Command	Keyword	Level
set landwar KN-7	attk_cap	65%

LANDWAR->attk_pull

Description: Level of cohesion (%) at which units in an attacking command are pulled from the front into a reconstituting mission.

Default: 35

Maximum: 99

Minimum: 1

Example(s):

Command	Keyword	Level
set landwar KN-7	attk_pull	55%

LANDWAR->attk_reconst

Description: Level of cohesion (%) at which reconstituting units in an attacking command are deemed to be ready for transfer to reserves.

Default: 70

Maximum: 100

Minimum: 1

Example(s):

Command	Keyword	Level
set landwar KN-7	attk_reconst	65%

LANDWAR->attk_replace

Description: Level of cohesion (%) at which units in an attacking command are replaced with a reserve unit, if one is available. The replaced unit assumes a reserve mission.

Default: 50

Maximum: 99

Minimum: 1

Example(s):

Command	Keyword	Level
set landwar	KN-7	attk_replace
		55%

LANDWAR->axis_comm

Description: Allows the user to specify the classes of maneuver forces that may be committed by the LoC Commander. The default is On (meaning that commitment is allowed) for normal maneuver forces—i.e., armor, mech, and infantry units—but Off for specialized forces, such as airborne, air cavalry, airmobile, amphibious, and security units.

Example(s):

Command	Keyword	Class	On/Off
set landwar	KN-C	axis_comm	aircav
			On

LANDWAR->def_replace

Description: Distance (km) behind MOFL (most-forward-unit line) that a reserve defending unit assumes a Positional Defense mission while awaiting a passage of lines with the unit to be replaced.

Default: 30

Example(s):

Command	Keyword	Distance
set landwar	KN-7	def_replace
		15

LANDWAR->def_with

Description: Distance (km) behind CONL (controlled line) to which defending units are sent when they are pulled from the MOFL (most-forward-unit line).

Default: 30

Example(s):

Command	Keyword	Distance
set landwar	KN-7	def_with
		10

LANDWAR->delay_pct

Description: Percentage of a command's forward force that fights in contact with the attacker when delaying.

Default: 33

Example(s):

Command	Keyword	Per cent
set landwar KN-7	delay_pct	50%

LANDWAR->delay_rear

Description: Distance (km) to which the forward force moves back in delay posture before attempting to form a new defense line.

Default: 20

Example(s):

Command	Keyword	Distance
set landwar KN-7	delay_rear	25

LANDWAR->dfdr_flank

Description: Maximum flank length (km) a defender allows on either side of an LoC before withdrawing the distance specified by *LANDWAR->flank_withdr*.

Default: 50

Example(s):

Command	Keyword	Distance
set landwar KN-7	dfdr_flank	35

LANDWAR->dfnd_pull

Description: Level of cohesion (%) at which units in a defending command are pulled from the front into a reconstituting mission, unless they are the last unit on the front or the current battle type is breakthrough.

Default: 35

Maximum: 99

Minimum: 1

Example(s):

Command	Keyword	Level
set landwar KN-7	dfnd_pull	35%

LANDWAR->dfnd_reconst

Description: Level of cohesion (%) at which reconstituting units in a defending command are deemed to be ready for transfer to reserves.

Default: 70

Maximum: 100

Minimum: 1

Example(s):

Command	Keyword	Level
set landwar KN-7	dfnd_reconst	55%

LANDWAR->dfnd_replace

Description: Level of cohesion (%) at which units in a defending command are replaced with a reserve unit, if one is available. The replaced unit assumes a reserve mission.

Default: 50

Maximum: 99

Minimum: 1

Example(s):

Command	Keyword	Level
set landwar KN-7	dfnd_replace	35%

LANDWAR->flank_dense

Description: Force density required on the flank relative to the front (1.0 would mean that the flank is required to maintain the same density as the front's).

Default: .5

Example(s):

Command	Keyword	Value
set landwar KN-5C	flank_dense	.75

LANDWAR->flank_lim

Description: Maximum flank length (km) an attacker allows on either side of an attack before stopping the attack.

Default: 50

Example(s):

Command	Keyword	Distance
set landwar KN-7	flank_lim	25

LANDWAR->flank_withdr

Description: Distance (km) an attacker withdraws when a flank is overexposed (i.e., when there is an exposed flank of length greater than *LANDWAR->dfdr_flank*).

Default: 30

Example(s):

Command	Keyword	Distance
set landwar KN-7	flank_withdr	25

LANDWAR->no_adv

Description: If turned on, an unopposed defending command can advance to its ordered position.

Default: off

Example(s):

Command	Keyword	Option
set landwar KN-7	no_adv	on

LANDWAR->nuc_halt

Description: Time (hours) a command halts after a nuclear strike.

Default: 48

Maximum: 720

Minimum: 0

Example(s):

Command	Keyword	Time
set landwar KN-7	nuc_halt	36

LANDWAR->pos_pass

Description: Distance (km) behind CONL (controlled line) that a command assumes a positional defense when a defending command must pass back through it.

Default: 10

Example(s):

Command	Keyword	Distance
set landwar KN-7	pos_pass	5

LANDWAR->pos_reconst

Description: If turned on, then reconstituting units of that command assume a Positional Defense mission once their cohesion has returned. If off, the units are transferred to reserves once they have reconstituted.

Default: off

Example(s):

Command	Keyword	Option
set landwar KN-7	pos_reconst	on

LANDWAR->rsv_bck_dist

Description: Maximum distance (km) behind CONL (controlled line) maintained by a force in reserve. If actual distance exceeds this distance, the reserve force will begin to move forward.

Default: 30

Example(s):

Command	Keyword	Distance
set landwar KN-7	rsv_bck_dist	50

LANDWAR->rsv_fwd_dist

Description: Minimum distance (km) behind CONL (controlled line) maintained by a force in reserve. If actual distance becomes less than this distance, the reserve force will begin to move back.

Default: 10

Example(s):

Command	Keyword	Distance
set landwar KN-7	rsv_fwd_dist	30

LANDWAR->withd_pct

Description: Percentage of a command's forward force that fights in contact with the attacker when withdrawing.

Default: 15

Example(s):

Command	Keyword	Per cent
set landwar KN-7	withd_pct	25%

LANDWAR->withd_rear

Description: Distance (km) to which the forward force moves back in withdraw posture before attempting to form a new defense line.

Default: 20

Example(s):

Command	Keyword	Distance
set landwar KN-7	withd_rear	35

Q. Parameters for: Ground<>arty_losses

CONTENTS (5 parameters):

LANDWAR->ai_artloss	LANDWAR->bai_artloss
LANDWAR->cas_artloss	LANDWAR->hel_artloss
LANDWAR->lra_artloss	

LANDWAR->ai_artloss

Description: Alternative to arty_kill data. When THIS parameter is NON-ZERO, it means:

When 1 eq. [equivalent] AI sortie attacks me, use MY value of ai_artloss/100 to decide how many artillery pieces are killed, NOT the attacker's arty_kills data (which is the normal method).

Note: A value of 100 here means 100% of a piece, i.e., ONE artillery piece gets killed per eq. sortie when ai_artloss = 100.

Default: 0 (meaning use standard arty_kills data)

Maximum: 250

Minimum: 0

Example(s):

Command	Keyword	Value
set landwar KN-7	ai_artloss	20% (of a vehicle)

LANDWAR->bai_artloss

Description: Alternative to arty_kill data. When THIS parameter is NON-ZERO, it means:

When 1 eq. BAI sortie attacks me, use MY value of bai_artloss/100 to decide how many artillery pieces are killed, NOT the attacker's arty_kills data (which is the normal method).

Note: A value of 100 here means 100% of a piece, i.e., ONE artillery piece gets killed per eq. sortie when bai_artloss = 100.

Default: 0 (meaning use standard arty_kills data)

Maximum: 250

Minimum: 0

Example(s):

Command	Keyword	Value
set landwar KN-7	bai_artloss	20% (of a vehicle)

LANDWAR->cas_artloss

Description: Alternative to arty_kill data. When THIS parameter is NON-ZERO, it means:

When 1 eq. CAS sortie attacks me, use MY value of cas_artloss/100 to decide how many artillery pieces are killed, NOT the attacker's arty_kills data (which is the normal method).

Note: A value of 100 here means 100% of a piece, i.e., ONE artillery piece gets killed per eq. sortie when cas_artloss = 100.

Default: 0 (meaning use standard arty_kills data)

Maximum: 250

Minimum: 0

Example(s):

Command	Keyword	Value
set landwar KN-7	cas_artloss	20% (of a vehicle)

LANDWAR->hel_artloss

Description: Alternative to arty_kill data. When THIS parameter is NON-ZERO, it means:

When 1 eq. Helo sortie attacks me, use MY value of hel_artloss/100 to decide how many artillery pieces are killed, NOT the attacker's arty_kills data (which is the normal method).

Note: A value of 100 here means 100% of a piece, i.e., ONE artillery piece gets killed per eq. sortie when hel_artloss = 100.

Default: 0 (meaning use standard arty_kills data)

Maximum: 250

Minimum: 0

Example(s):

Command	Keyword	Value
set landwar KN-7	hel_artloss	20% (of a vehicle)

LANDWAR->lra_artloss

Description: Alternative to arty_kill data. When THIS parameter is NON-ZERO, it means:

When 1 eq. LRA volley attacks me, use MY value of lra_artloss/100 to decide how many artillery pieces are killed, NOT the attacker's arty_kills data (which is the normal method).

Note: A value of 100 here means 100% of a piece, i.e., ONE artillery piece gets killed per eq. volley when lra_artloss = 100.

Default: 0 (meaning use standard arty_kills data)

Maximum: 250

Minimum: 0

Example(s):

Command	Keyword	Value
set landwar KN-7	lra_artloss	20% (of a vehicle)

R. Parameters for: Ground<>internal_battle

CONTENTS (3 parameters):

ITM->overrun_mult	LANDWAR->piecemeal
LANDWAR->rear_diver	

ITM->overrun_mult

Description: EED multiplier for overrun ground forces.

Default: .50

Maximum: 1.0

Minimum: .1

Example(s):

Theater	Keyword	New Value	
set itm	CFCK	overrun_mult	.70

LANDWAR->piecemeal

Description: Percentage of overrun forces that need to be engaged.

Default: 100

Maximum: 100

Minimum: 10

Example(s):

Command	Keyword	Percent	
set landwar	CFCK	piecemeal	80

LANDWAR->rear_diver

Description: Relative loss in forward EED strength per EED of enemy strength operating in the rear. (This loss is treated as a diversion of strength to deal with the forces in the rear.)

Default: .5

Example(s):

Command	Keyword	Value
set landwar KN-7	rear_diver	1.2

S. Parameters for: Ground<>battle_intensity

CONTENTS (8 parameters):

LANDWAR->high_dldr	LANDWAR->high_er
LANDWAR->high_move	LANDWAR->low_dldr
LANDWAR->low_er	LANDWAR->low_move
LANDWAR->max_int_days	LANDWAR->resup_int

LANDWAR->high_dldr

Description: Defender's loss rate multiplier at high combat intensity.

Default: 1.4

Example(s):

Command	Keyword	value
set landwar	KN-5C	high_dldr
		1.4

LANDWAR->high_er

Description: Exchange rate multiplier at high combat intensity.

Default: 1.4

Example(s):

Command	Keyword	value
set landwar	KN-5C	high_er
		1.3

LANDWAR->high_move

Description: Movement rate multiplier at high combat intensity.

Default: 1.4

Example(s):

Command	Keyword	value
set landwar	KN-5C	high_move
		1.5

LANDWAR->low_dldr

Description: Defender's loss rate multiplier at low combat intensity.

Default: .5

Example(s):

Command	Keyword	Value
set landwar	KN-5C	low_dldr
		.8

LANDWAR->low_er

Description: Exchange rate multiplier at low combat intensity.

Default: .5

Example(s):

Command	Keyword	Value
set landwar	KN-5C	low_er
		.65

LANDWAR->low_move

Description: Movement rate multiplier at low combat intensity.

Default: .5

Example(s):

Command	Keyword	Value
set landwar	KN-5C	low_move
		.4

LANDWAR->max_int_days

Description: Maximum number of days that a high-intensity attack can be maintained.

Default: 5

Example(s):

Command	Keyword	Days
set landwar	KN-7	max_int_days
		14

LANDWAR->resup_int

Description: Days of inactivity required before a command can resume high-intensity attacks.

Default: 10

Maximum: 30

Minimum: 1

Example(s):

Command	Keyword	Days
set landwar KN-7	resup_int	14

T. Parameters for: Ground<>attack_requirements

CONTENTS (4 parameters):

LANDWAR->attk_join	LANDWAR->attk_main
LANDWAR->attk_pin	LANDWAR->attk_spt

LANDWAR->attk_join

Description: The force ratio required for a join-attack mission.

Default: 1.2

Example(s):

Command	Keyword	Value
set landwar	KN-5C	attk_join
		1.5

LANDWAR->attk_main

Description: The force ratio required for a main attack or counter-attack.

Default: 1.5

Example(s):

Command	Keyword	Value
set landwar	KN-5C	attk_main
		2.0

LANDWAR->attk_pin

Description: The force ratio required for a pinning attack.

Default: 1.25

Example(s):

Command	Keyword	Value
set landwar	KN-5C	attk_pin
		1.5

LANDWAR->attk_spt

Description: The force ratio required for a supporting attack.

Default: 1.1

Example(s):

Command	Keyword	Value
set landwar	KN-5C	attk_spt
		1.5

U. Parameters for: Ground<>breakthrough

CONTENTS (10 parameters):

LANDWAR->arty_escape_pct	LANDWAR->arty_trap_pct
LANDWAR->barrier_loss	LANDWAR->brk_density
LANDWAR->brk_ex_ratio	LANDWAR->brk_loss
LANDWAR->brk_ratio	LANDWAR->delay_density
LANDWAR->recv_r_density	LANDWAR->withd_density

LANDWAR->arty_escape_pct

Description: Percentage of a positional maneuver force's artillery that transfers to its positional command's separate artillery force when the maneuver force is overrun at the command's forward battle.

Default: 70

Maximum: 100

Minimum: 0

Example(s):

Command	Keyword	Per cent
set landwar CFCK	arty_escape_pct	45%

LANDWAR->arty_trap_pct

Description: Percentage of a positional command's separate artillery that transfers to a positional command's forward maneuver force when the maneuver force is overrun at the command's forward battle.

Default: 30

Maximum: 100

Minimum: 0

Example(s):

Command	Keyword	Per cent
set landwar CFCK	arty_trap_pct	45%

LANDWAR->barrier_loss

Description: One-time percentage attrition to a defender pushed out of a prepared defensive position. Attacker losses are given by the LANDWAR->brk_ex_ratio.

When such an adjudication occurs, the LANDWAR->barrier_loss of the DEFENDING command is used for defender losses, and the LANDWAR->brk_ex_ratio of the DEFENDING command is used for calculating attacker losses.

Default: 5

Example(s):

Command	Keyword	Per cent
set landwar KN-7	barrier_loss	10%

LANDWAR->brk_density

Description: Defender's SED/km density below which a breakthrough occurs while defending (brk_density>recv_density).

Default: .01

Example(s):

Command	Keyword	Density
set landwar KN-5C	brk_density	0.1

LANDWAR->brk_ex_ratio

Description: The exchange ratio for calculating the attacker's losses from the special losses taken by the defender suffering a breakthrough (parameters break_loss and barrier_loss).

When such an adjudication occurs, the brk_ex_ratio of the DEFENDING command is used for calculating attacker losses.

Example(s):

Command	Keyword	Value
set landwar KN-5C	brk_ex_ratio	1.5

LANDWAR->brk_loss

Description: One-time percentage attrition to a defender suffering a breakthrough. Attacker losses are calculated using the LANDWAR->brk_ex_ratio.

When such an adjudication occurs, the LANDWAR->brk_loss of the DEFENDING command is used for defender losses, and the LANDWAR->brk_ex_ratio of the DEFENDING command is used for calculating attacker losses.

Default: 5

Example(s):

Command	Keyword	Per cent
set landwar KN-7	brk_loss	10%

LANDWAR->brk_ratio

Description: Attacker/defender TED force ratio required to achieve a breakthrough if the attacker SED/km density is below what is necessary to cover the terrain width (brk_density * brk_fr).

Default: 2.0

Maximum: 100.0

Minimum: 0

Example(s):

Command	Keyword	Force Ratio
set landwar KN-5C	brk_ratio	2.0

LANDWAR->delay_density

Description: Defender's SED/km density below which a breakthrough occurs while delaying.

Default: .005

Example(s):

Command	Keyword	Density
set landwar KN-5C	delay_density	0.1

LANDWAR->recv_density

Description: SED/km density at which a defender in the exploitation phase of a breakthrough can establish a line of defense (recv_density>brk_density).

Default: .05

Example(s):

Command	Keyword	Density
set landwar KN-5C	recv_density	0.1

LANDWAR->withd_density

Description: Defender's SED/km density below which a breakthrough occurs while withdrawing.

Default: .001

Example(s):

Command	Keyword	Density
set landwar KN-5C	withd_density	0.1

V. Parameters for: Ground<>front_limits

CONTENTS (4 parameters):

LANDWAR->armor_min_fwd	LANDWAR->arty_min_fwd
LANDWAR->infty_min_fwd	LANDWAR->keep_up_mult

LANDWAR->armor_min_fwd

Description: Minimum number of armored vehicles that can be kept at the front at the maximum rate of advance. See the function ITM-Congestion in the Abel file sfs.A for its use.

Default: 80

Maximum: 1000

Minimum: 1

Example(s):

Command	Keyword	Value
set landwar KN-7	armor_min_fwd	80

LANDWAR->arty_min_fwd

Description: Minimum number of artillery that can be kept at the front at the maximum rate of advance. See the function ITM-Congestion in the Abel file sfs.A for its use.

Default: 200

Maximum: 1000

Minimum: 1

Example(s):

Command	Keyword	Value
set landwar KN-7	arty_min_fwd	200

LANDWAR->infty_min_fwd

Description: Minimum number of infantry weapons that can be kept at the front at the maximum rate of advance. See the function ITM-Congestion in the Abel file sfs.A for its use.

Default: 5000

Maximum: 10000

Minimum: 1

Example(s):

Command	Keyword	Value
set landwar	KN-7	infty_min_fwd
		5000

LANDWAR->keep_up_mult

Description: Multiplier regarding the ability of arty to keep up with rapid advances.

Default: 1.0

Maximum: 10.0

Minimum: .01

Example(s):

Command	Keyword	Density
set landwar	KN-5C	keep_up_mult
		0.1

W. Parameter for: Ground<>log_base

CONTENTS (1 parameter):

LANDWAR->log_move

LANDWAR->log_move

Description: Maximum distance (km) between logistics base and the command's MOFL. When this distance is reached, the command will halt and move the logistics base forward.

Default: 50

Example(s):

Command	Keyword	Distance
set landwar KN-7	log_move	80

X. Parameters for: Ground<>unit_resup/reconst

CONTENTS (22 parameters):

ITM->dos_disrupt	ITM->tail_atk
ITM->tail_hold	ITM->tail_min
ITM->tail_spd	LANDWAR->attk_hos
LANDWAR->tail_half	MATERIEL->days_recover
MATERIEL->days_repair	MATERIEL->gndforce_cap
MATERIEL->intense_mult	MATERIEL->local_repair
MATERIEL->max_replace	MATERIEL->min_losses
MATERIEL->network_cap	MATERIEL->rear_repair
MATERIEL->reorder_point	MATERIEL->replace_hrs
MATERIEL->supply_loss	MATERIEL->supply_mult
MATERIEL->supply_objective	MATERIEL->supply_rate

ITM->dos_disrupt

Description: Delay in delivery of ammo resupply caused by 1 sortie or volley, in ED days of supply. It is used to model the disruption of the supply system caused by air attack.

Defaults: CAS BAI AI Helo Arty
.001 .001 .001 .001 .001

Maximum: 1.00

Minimum: .000

Example(s):

Theater	Keyword	5 New Values for:	CAS	BAI	AI	Helo	Arty
set itm CFCK	dos_disrupt	.002 .004 .005 .002 .003					

ITM->tail_atk

Description: Maximum length of logistics tail (km) to launch a new attack. If the current length exceeds this length in a command in which an attack is not already ongoing, an attack cannot be initiated until the tail shortens.

Default: 40 All Theaters

Maximum: 500

Minimum: 5

Example(s):

Theater	Keyword	Kms
set itm	DPRK	tail_atk
		20

ITM->tail_hold

Description: Maximum length (km) of logistics tail before the front is ordered to stop attacking or advancing.

Default: 200 All Theaters

Maximum: 5000

Minimum: 5

Example(s):

Theater	Keyword	Kms
set itm	DPRK	tail_hold
		190

ITM->tail_min

Description: Minimum length of logistics tail, in kms. The support forces in a command strive to shorten the tail length to this value.

Default: 20 All Theaters

Maximum: 50

Minimum: 5

Example(s):

Theater	Keyword	Kms
set itm	DPRK	tail_min
		10

ITM->tail_spd

Description: Maximum speed of the logistics tail (km per day). It is the rate at which the current tail length can shorten. Setting tail_spd to 500 effectively turns off the logistics tail method.

Default: 10 All Theaters

Maximum: 500

Minimum: 1

Example(s):

Theater	Keyword	Kms/Day
set item	DPRK	tail_spd 15

LANDWAR->attk_hos

Description: Minimum hours of supply that command's frontal forces must have on hand if they are to attack this delta-t.

Default: 24 hours for all commands

Maximum: 250

Minimum: 1

Example(s):

Command	Keyword	Kms
set landwar	KN-5C	attk_hos 48

LANDWAR->tail_half

Description: Length of log tail beyond the minimum (LANDWAR->tail_min) at which the flow of supplies is reduced by 50%.

Default: 50 All commands

Maximum: 500

Minimum: 1

Example(s):

Command	Keyword	Kms
set landwar	KN-5C	tail_half 40

MATERIEL->days_recover

Description: The number of days needed for a ground force to recover 10% of lost cohesion, depending on the force's current combat posture.

Postures are: contact, non-contact, reconstituting, and cut-off

Default: 1000, 2, 3, 1000

Maximum: 1000

Minimum: 1

Example(s):

Theater	Keyword	Posture	New Value
set materiel CFCK	days_recover	non-contact	.04

MATERIEL->days_repair

Description: The number of days for REAR supporting maintenance to repair a weapon. Types of weapons are:

 tank ifv apc hv_y_arv lgt_arv lr_atgm sr_atgm
 sm_mortar sm_arms sp_arty td_arty gded_adef oir_adef atk_helo

Default: too numerous to list here

Maximum: 20

Minimum: 1

Example(s):

Theater	Keyword	Weapon	New Value
set materiel CFCK	days_repair	tank	12

MATERIEL->gndforce_cap

Description: The maximum number of days of supply that a force can receive per day.

Default: 2.0

Maximum: 9999

Minimum: 0

Example(s):

Theater	Keyword	New Value
set materiel CFCK	gndforce_cap	5

MATERIEL->intense_mult

Description: Multiplier of consumption when intense combat obtains.

Default: 1.5

Maximum: 5.0

Minimum: 1.0

Example(s):

Theater	Keyword	New Value
set materiel CFCK	intense_mult	1.2

MATERIEL->local_repair

Description: The fraction of total losses that are repairable by the losing force's organic maintenance capability, by weapon type. Weapon types are:

tank ifv apc hvy_arv lgt_arv lr_atgm sr_atgm
sm_mortar sm_arms sp_artillery td_artillery gdad_ahead oir_ahead atk_helo

Note: The value of local_repair + rear_repair cannot exceed 1.0 for any weapon type. Therefore, [1.0 - (local_repair + rear_repair)] is K-kills.

Default: too numerous to list here

Maximum: .99

Minimum: 0.0

Example(s):

Theater	Keyword	Weapon	New Value
set materiel CFCK	local_repair	tank	.25

MATERIEL->max_replace

Description: The maximum fraction of original-strength weapons that can be issued as replacements to a ground force in a day, depending on the force's current combat posture.

Postures are: contact, non-contact, reconstituting, and cut-off

Default: .02, .03, .05, .01

Maximum: 1.0

Minimum: 0

Example(s):

Theater	Keyword	Posture	New Value
set materiel CFCK	max_replace	non-contact	.04

MATERIEL->min_losses

Description: The fraction of losses that must occur before replacements are issued.

Default: .05

Maximum: .95

Minimum: .01

Example(s):

Theater	Keyword	New Value
set materiel CFCK	min_losses	.03

MATERIEL->network_cap

Description: The maximum number of days of supply that a theater can deliver per day.

Default: 9999 (no limit)

Maximum: 9999

Minimum: 0

Example(s):

Theater	Keyword	New Value
set materiel CFCK	network_cap	40

MATERIEL->rear_repair

Description: The fraction of total losses that are repairable by the losing force's rear-supporting maintenance capability, by weapon type. Weapon types are:

 tank ifv apc hvya_rv lgt_arv lr_atgm sr_atgm
 sm_mortar sm_arms sp_artillery td_artillery gdad_aed oir_aed atk_helo

Note: The value of local_repair + rear_repair cannot exceed 1.0 for any weapon type. Therefore, [1.0 - (local_repair + rear_repair)] is K-kills.

Default: too numerous to list here

Maximum: .99

Minimum: 0.0

Example(s):

Theater	Keyword	Weapon	New Value
set materiel CFCK	rear_repair	tank	.25

MATERIEL->reorder_point

Description: Number of days of supply at or below which it is time for the supply model to simulate delivery of more supplies to a unit (in days of supply).

Default: 4.0

Maximum: 20.0

Minimum: 1.0

Example(s):

Theater	Keyword	New Value
set materiel CFCK	reorder_point	3.0

MATERIEL->replace_hrs

Description: The number of hours after H-hour required before the first replacement weapon can reach a ground force.

Default: 72

Maximum: 10000

Minimum: 0

Example(s):

Theater	Keyword	New Value
set materiel CFCK	replace_hrs	192

MATERIEL->supply_loss

Description: Analyst-scripted extra losses of supply during delivery. This fraction is taken against every delivery of ed_supply.

Default: 0.0

Maximum: 1.0

Minimum: 0.0

Example(s):

Theater	Keyword	New Value
set materiel CFCK	supply_loss	.08

MATERIEL->supply_mult

Description: Analyst multiplier of all theater supply consumption.

Default: 1.0

Maximum: 5.0

Minimum: .1

Example(s):

Theater	Keyword	New Value
set materiel CFCK	supply_mult	1.2

MATERIEL->supply_objective

Description: Number of days of supply desired for a force, in days of supply.

Default: 5.0

Maximum: 20.0

Minimum: 2.0

Example(s):

Theater	Keyword	New Value
set materiel CFCK	supply_objective	3.0

MATERIEL->supply_rate

Description: Number of days of supply (DoS) consumed per day at the specified posture, expressed as a percentage of the standard consumption rate. For example, if the basic ground force supply inventory in your database were expressed in defend DoS, you would state the supply_rate at the defend posture as 100%, and at all other postures relative to that, say, 110% for main-attack if one expends 10% more at that posture than at a defend posture.

The allowable postures and their default DoS percentages are (all commands):

Mission	DoS	Mission	DoS
*****	***	*****	***
Main-Attack	100	Defend	120
Supporting-Attack	80	Defend-delay	120
Pinning-Attack	50	Defend-Withdraw	120
Joining-Attack	50	Delay	40
Counterattack	100	Withdraw	40
Penetration-Attack	100	Forced-Withdraw	40
Follow	5	Break-Out	100
Rear-Echelon	5	Positional	120
Clean-up	100	Artillery	70
AirDrop	100		
AirAssault	100	No-Combat	1

Default: see table above

Maximum: 250

Minimum: 0

Example(s):

Theater	Keyword	Posture	New DoS
set materiel CFCK	supply_rate	defend	90%

Y. Parameters for: Ground<>air_to_ground

CONTENTS (12 parameters):

ITM->arty_kills	ITM->dos_disrupt
ITM->ed_delay_hrs	ITM->infty_allocs
ITM->infty_kills	ITM->jstars_kills
ITM->kill_mult	ITM->min_flot_kpd
ITM->msl_kill_move	ITM->msl_kill_stat
ITM->rekills	ITM->vehicle_kills

ITM->arty_kills

Description: Enemy artillery killed by target posture for 1 standard equivalent sortie (1 standard engagement for long-range artillery).

Target postures are: attack defend delay moving

Attacking mission are: CAS, BAI, AI, Helo, Arty

Defaults: Posture CAS BAI AI Helo Arty

attack	.40	.25	.25	.40	.25
defend	.40	.25	.25	.40	.25
delay	.40	.25	.25	.40	.25
moving	.40	.25	.25	.40	.25

Maximum: 100

Minimum: 0

Example(s):

Theater	Keyword	Posture	5 New Values for:				
			CAS	BAI	AI	Helo	Arty
set item CFCK	arty_kills	moving	1.2	.7	.8	1.3	.9

ITM->dos_disrupt

Description: Delay in delivery of ammo resupply caused by 1 sortie or volley (in ED days of supply). This delay is used to model the disruption of the supply system by air attack.

Defaults: CAS BAI AI Helo Arty
.001 .001 .001 .001 .001

Maximum: 1.00

Minimum: .000

Example(s):

		5 New Values for:				
Theater	Keyword	CAS	BAI	AI	Helo	Arty
set itm CFCK	dos_disrupt	.002	.004	.005	.002	.003

ITM->ed_delay_hrs

Description: Delay caused by 1 sortie or volley of attack per ED of moving target (per engagement for artillery engagement).

Defaults: CAS BAI AI Helo Arty
.083 .040 .040 .083 .040

Maximum: 1.00

Minimum: .001

Example(s):

		5 New Values for:				
Theater	Keyword	CAS	BAI	AI	Helo	Arty
set itm CFCK	ed_delay_hrs	.075	.045	.021	.080	.055

ITM->infty_allocs

Description: Number of infantry given weight equal to one vehicle when allocating between vehicles and infantry the sorties or engagements attacking a ground unit.

Defaults: CAS BAI AI Helo Arty
50 50 50 20 50

Maximum: 100

Minimum: 0

Example(s):

		5 New Values for:				
Theater	Keyword	CAS	BAI	AI	Helo	Arty
set item CFCK	infty_allocs	20.0	30.0	10.0	25.0	20.0

ITM->infty_kills

Description: Multiplies ITM->vehicle_kills to give the number of infantry killed by a friendly equivalent sortie or engagement.

Defaults: CAS BAI AI Helo Arty
 50 50 50 20 50

Maximum: 100.0

Minimum: .5

Example(s):

		5 New Values for:				
Theater	Keyword	CAS	BAI	AI	Helo	Arty
set item CFCK	infty_kills	20.0	30.0	10.0	25.0	20.0

ITM->jstars_kills

Description: Multiplier of air-to-ground kill rates when a JSTARS package is flying.

Default: 1.1

Maximum: 10.0

Minimum: 1.0

Example(s):

Theater	Keyword	New Value
set item CFCK	jstars_kills	1.1

ITM->kill_mult

Description: Analyst multiplier of all other air-to-ground or LR-artillery kill data.

Default: 1.0 for CAS , BAI, AI, Helo

Maximum: 10.0

Minimum: .01

Example(s):

Theater	Keyword	5 New Values for:				
		CAS	BAI	AI	Helo	Arty
set item CFCK	kill_mult	1.50	3.30	1.0	2.20	1.1

ITM->min_flot_kpd

Description: Minimum FLOT speed below which the delay effects of CAS, BAI, and Helo interdiction have no effect.

Default: 5

Maximum: 250

Minimum: 0

Example(s):

Theater	Keyword	New Value
set item CFCK	min_flot_kpd	5

ITM->msl_kill_move

Description: Enemy launchers killed per 1 standard equivalent sortie delivered when AI targets a missile force that is moving (deploying).

See also **ITM->msl_kill_stat**.

Default: .1

Maximum: 10.0

Minimum: 0

Example(s):

Theater	Keyword	Per Eq.Sort
set item CFCK	msl_kill_move	.05

ITM->msl_kill_stat

Description: Enemy launchers killed per 1 standard equivalent sortie delivered when AI targets a missile force that is stationary (not deploying).

See also **ITM->msl_kill_move**.

Default: 1.0

Maximum: 10.0

Minimum: 0

Example(s):

Theater	Keyword	Per Eq. Sort
set	itm CFCK	msl_kill_stat .5

ITM->rekills

Description: The probability that any previously killed vehicles in a target force are considered to be live by the attacker. If a target has P live vehicles and Q dead vehicles, the attacker's capability will be spread evenly across $P + ITM->rekills \times Q$ vehicles.

Note: This fledgling model is now limited to assessing vehicle kills only. It does <<not>> yet affect the allocation of sorties (volleys) among vehicle and non-vehicle targets.

For example, if the raw calculations are that V vehicles are to be killed in a target with N live vehicles and $M \geq N$ vehicles total, the number of live kills that will be adjudicated is:

$$\text{live_kills} = V * N / (N + ITM->rekills * (M - N))$$

Target postures are: attack, defend, delay, moving

Attacking mission are: CAS, BAI, AI, Helo, Arty

Defaults: Posture CAS BAI AI Helo Arty

attack	.1	.1	.1	.1	.0
defend	.2	.2	.2	.2	.0
delay	.1	.1	.1	.1	.0
moving	.1	.1	.1	.1	.0

Maximum: 1.0

Minimum: 0

Example(s):

Theater	Keyword	Target Posture	5 New Values for:					
			CAS	BAI	AI	Helo	Arty	
set	itm CFCK	rekills	moving	.3	.2	.4	.2	.1

ITM->vehicle_kills

Description: Enemy vehicles killed by target posture for 1 standard equivalent sortie (1 standard volley for long-range artillery).

Target postures are: attack, defend, delay, moving

Attacking mission are: CAS, BAI, AI, Helo, Arty

Defaults: Posture CAS BAI AI Helo Arty

attack	1.5	1.0	1.0	.9	1.0
defend	.6	.4	.4	.4	.4
delay	1.5	1.0	1.0	.9	1.0
moving	1.5	1.5	1.5	.2	1.5

Maximum: 100

Minimum: 0

Example(s):

Theater	Keyword	Target Posture	5 New Values for:
			CAS BAI AI Helo Arty
set item CFCK	vehicle_kills	moving	1.2 .7 .8 1.3 .9

Z. Parameters for: Ground<>attack_helos

CONTENTS (20 parameters):

HELOS->flot_dist	HELOS->helo_arty
HELOS->hel_range	HELOS->hel_req_arm
HELOS->hel_sort	HELOS->hel_timing
HELOS->hvuln_atk	HELOS->hvuln_base
HELOS->hvuln_def	HELOS->night_kill
HELOS->night_vuln	HELOS->wx_kill_pct
HELOS->wx_sort_pct	ITM->arty_kills
ITM->ed_delay_hrs	ITM->infty_allocs
ITM->infty_kills	ITM->kill_mult
ITM->rekills	ITM->vehicle_kills

HELOS->flot_dist

Description: Maximum kilometers forward of a supported command front (MOFL or FLOT) that helos seek targets IF no in-contact targets are available. However, targets will not be attacked beyond the theater command's BAI range, regardless of the value of this parameter.

See ITM->vehicle_kills in Appendix Y for helo kill data.

Default: 50

Maximum: 1000

Minimum: 0

Example(s):

Command	Keyword	New Value
set helos KS_11	flot_dist	60

HELOS->helo_arty

Description: Percentage of attack helicopter sorties that target artillery only. The rest attack maneuver weapons and air defense weapons.

Default: 0

Maximum: 100

Minimum: 0

Example(s):

Command	Keyword	Pct
set helos	KSCC	helo_arty
		10

HELOS->hel_range

Description: Maximum one-way distance that this command's attack helicopters can range (from parent unit to target unit), in km.

See ITM->vehicle_kills in Appendix Y for helo kill data.

Default: 200.0

Maximum: 1000.0

Minimum: 50.0

Example(s):

Command	Keyword	New Value
set helos	KS_11	hel_range
		400

HELOS->hel_req_arm

Description: Minimum number of vehicle targets in an enemy unit if the unit is to be considered a viable target for attack helicopters.

See ITM->vehicle_kills in Appendix Y for helo kill data.

Default: 20

Maximum: 500

Minimum: 0

Example(s):

Command	Keyword	New Value
set helos	KS_11	hel_req_arm
		15

HELOS->hel_sort

Description: Number of sorties per day to be flown by each attack helicopter in ground forces assigned to this command.

See ITM->vehicle_kills in Appendix Y for helo kill data.

Default: 3.0

Maximum: 20.0

Minimum: 0.0

Example(s):

Command	Keyword	New Value
set helos KS_11	hel_sort	2.7

HELOS->hel_timing

Description: The percentage of a command's total attack helicopter sorties that will be flown in each 4-hour period of the ITM day.

Note: This percentage is based on assigned command, not supported command.

See ITM->vehicle_kills in Appendix Y for helo kill data.

Default: 0 0 40 30 30 0

Example(s):

Command	Keyword	New Percent for Period					
		1	2	3	4	5	6
set helos KS_11	hel_timing	10	20	30	20	20	0

HELOS->hvuln_atk

Description: Fraction of attack helicopter sorties killed by enemy when the helos are flown against an attacking (moving) force, and when the target size is exactly HELOS->hvuln_base TEDs (see below).

See HELOS->hvuln_def, and ITM->vehicle_kills in Appendix Y for helo kill data.

Default: .04

Maximum: 1.00

Minimum: .001

Example(s):

Command	Keyword	New Value
set helos KS_11	hvuln_atk	.05

HELOS->hvuln_base

Description: Number of TEDs (density) assumed in the target area, and on which the HELOS->hvuln_atk and HELOS->hvuln_def are based. Helicopter losses increase inversely with this value.

See ITM->vehicle_kills in Appendix Y for helo kill data.

Default: .40

Maximum: 10.0

Minimum: .001

Example(s):

Command	Keyword	New Value
set helos	KS_11	hvuln_base
		.6

HELOS->hvuln_def

Description: Fraction of attack helicopter sorties killed by enemy when the helos are flown against a defending (stationary) force, and when the target size is exactly HELOS->hvuln_base TEDs.

See HELOS->hvuln_atk, and ITM->vehicle_kills in Appendix Y for helo kill data.

Default: .03

Maximum: 1.00

Minimum: .001

Example(s):

Command	Keyword	New Value
set helos	KS_11	hvuln_def
		.05

HELOS->night_kill

Description: Multiplier of helicopter kills during night periods.

Default: 1.0

Maximum: 100.0

Minimum: 0

Example(s):

Command	Keyword	New Value
set helos KS_11	night_kill	.5

HELOS->night_vuln

Description: Multiplier of helicopter losses during night periods.

Default: 1.0

Maximum: 100.0

Minimum: 0

Example(s):

Command	Keyword	New Value
set helos KS_11	night_vuln	.5

HELOS->wx_kill_pct

Description: Percentage of air-ground effects that will obtain (because of the weather).

Note: Value at midnight affects mission results all day long. Also, a separate parameter exists in the airwar table.

Default: 100

Maximum: 100

Minimum: 0

Example(s):

Command	Keyword	Pct
set helos KSCC	wx_kill_pct	70

HELOS->wx_sort_pct

Description: Percentage of sorties that will launch (because of weather considerations).

Note: Value at midnight affects missions all day long. Also, a separate parameter exists in the airwar table.

Default: 100

Maximum: 200

Minimum: 0

Example(s):

	Command	Keyword	Pct
set helos	KSCC	wx_sort_pct	70

ITM->arty_kills

Description: Enemy artillery killed by target posture for 1 standard equivalent sortie (1 standard engagement for long-range artillery).

Target postures are: attack, defend, delay, moving

Attacking mission are: CAS BAI AI Helo Arty

Defaults: Posture CAS BAI AI Helo Arty

attack	.40	.25	.25	.40	.25
defend	.40	.25	.25	.40	.25
delay	.40	.25	.25	.40	.25
moving	.40	.25	.25	.40	.25

Maximum: 100

Minimum: 0

Example(s):

Theater	Keyword	Target Posture	5 New Values for:				
			CAS	BAI	AI	Helo	Arty
set itm	CFCK	arty_kills moving	1.2	.7	.8	1.3	.9

ITM->ed_delay_hrs

Description: Delay caused by 1 sortie or volley of attack per ED of moving target (per engagement for artillery engagement).

Defaults: CAS BAI AI Helo Arty

.083 .040 .040 .083 .040

Maximum: 1.00

Minimum: .001

Example(s):

		5 New Values for:				
Theater	Keyword	CAS	BAI	AI	Helo	Arty
set itm CFCK	ed_delay_hrs	.075	.045	.021	.080	.055

ITM->infty_allocs

Description: Number of infantry given weight equal to one vehicle when allocating between vehicles and infantry the sorties or engagements attacking a ground unit.

Defaults: CAS BAI AI Helo Arty
50 50 50 20 50

Maximum: 100

Minimum: 0

Example(s):

		5 New Values for:				
Theater	Keyword	CAS	BAI	AI	Helo	Arty
set itm CFCK	infty_allocs	20.0	30.0	10.0	25.0	20.0

ITM->infty_kills

Description: Multiplies ITM->vehicle_kills to give the number of infantry killed by a friendly equivalent sortie or engagement.

Defaults: CAS BAI AI Helo Arty
50 50 50 20 50

Maximum: 100.0

Minimum: .5

Example(s):

		5 New Values for:				
Theater	Keyword	CAS	BAI	AI	Helo	Arty
set itm CFCK	infty_kills	20.0	30.0	10.0	25.0	20.0

ITM->kill_mult

Description: Analyst multiplier of all other air-to-ground or LR-artillery kill data.

Default: 1.0 for CAS, BAI, AI, Helo

Maximum: 10.0

Minimum: .01

Example(s):

Theater	Keyword	5 New Values for:				
		CAS	BAI	AI	Helo	Arty
set itm CFCK	kill_mult	1.50	3.30	1.0	2.20	1.1

ITM->rekills

Description: The probability that any previously killed vehicles in a target force are considered to be live by the attacker. If a target has P live vehicles and Q dead vehicles, the attacker's capability will be spread evenly across $P + ITM->rekills \times Q$ vehicles.

Note: This fledgling model is now limited to assessing vehicle kills only. It does <> yet affect the allocation of sorties (volleys) among vehicle and non-vehicle targets.

For example, if the raw calculations are that V vehicles are to be killed in a target with N live vehicles and $M \geq N$ vehicles total, the number of live kills that will be adjudicated is:

$$\text{live_kills} = V * N / (N + ITM->rekills * (M - N))$$

Target postures are: attack, defend, delay, moving

Attacking mission are: CAS, BAI, AI, Helo, Arty

Defaults: Posture CAS BAI AI Helo Arty

attack	.1	.1	.1	.1	.0
defend	.2	.2	.2	.2	.0
delay	.1	.1	.1	.1	.0
moving	.1	.1	.1	.1	.0

Maximum: 1.0

Minimum: 0

Example(s):

Theater	Keyword	Posture	5 New Values for:				
			CAS	BAI	AI	Helo	Arty
set itm CFCK	rekills	moving	.3	.2	.4	.2	.1

ITM->vehicle_kills

Description: Enemy vehicles killed by target posture for 1 standard equivalent sortie (1 standard volley for long-range artillery).

Target postures are: attack, defend, delay, moving

Attacking mission are: CAS, BAI, AI, Helo, Arty

Defaults: Posture CAS BAI AI Helo Arty

attack	1.5	1.0	1.0	.9	1.0
defend	.6	.4	.4	.4	.4
delay	1.5	1.0	1.0	.9	1.0
moving	1.5	1.5	1.5	.2	1.5

Maximum: 100

Minimum: 0

Example(s):

Theater	Keyword	Target Posture	5 New Values for:				
			CAS	BAI	AI	Helo	Arty
set item CFCK	vehicle_kills	moving	1.2	.7	.8	1.3	.9